ELECTRICAL REVIEW

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DETROIT

All are made to specification...

There is one safe course . . . use the cables which are not only made to specification but have had equal attention given to the *unspecified* details. To be sure, choose

Aberdare Cables

Paper insulated cables up to 33kV to BSS or other well-known specifications.

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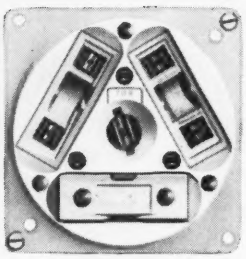
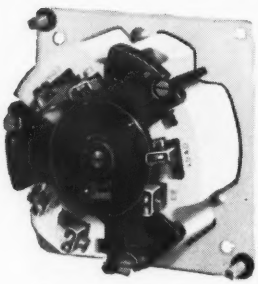
London Office: NINETEEN WOBURN PLACE, W.C.1.

Splendid Isolation

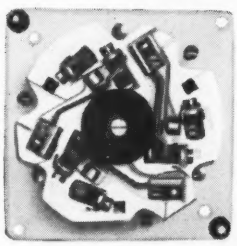
Attractively designed cover and cast iron case of the MEM Rotary Fused Isolator are finished in grey stove enamel.



Fuse inspection is absolutely safe. The fuse sockets are isolated by the removal of the cover and it is impossible to touch live metal.



Wiring is especially easy. Heavy clamp terminals are provided and are clearly identified. An indicator shows whether the switch is on or off.



The three phases of the robust cam operated switch are separated by thick porcelain walls. Contacts are solid silver. Inspection is simple once the plastic switch cover is removed.

Handsome appearance and high efficiency go hand in hand here, in the MEM Rotary Fused Isolator.

Designed for use with A.C. Motors on machine tools and other similar applications, this switch is of a slow break A.C. pattern rated at 15 amps., 500 volts. It will safely disconnect a stalled motor of 7½ h.p. taking six to eight times full load current.

The unit takes 15 amp., rewirable " Kantark Major " fuses or alternatively you can choose standard H.R.C. fuse links to the dimensions of B.S.88 1952, Appendix J.

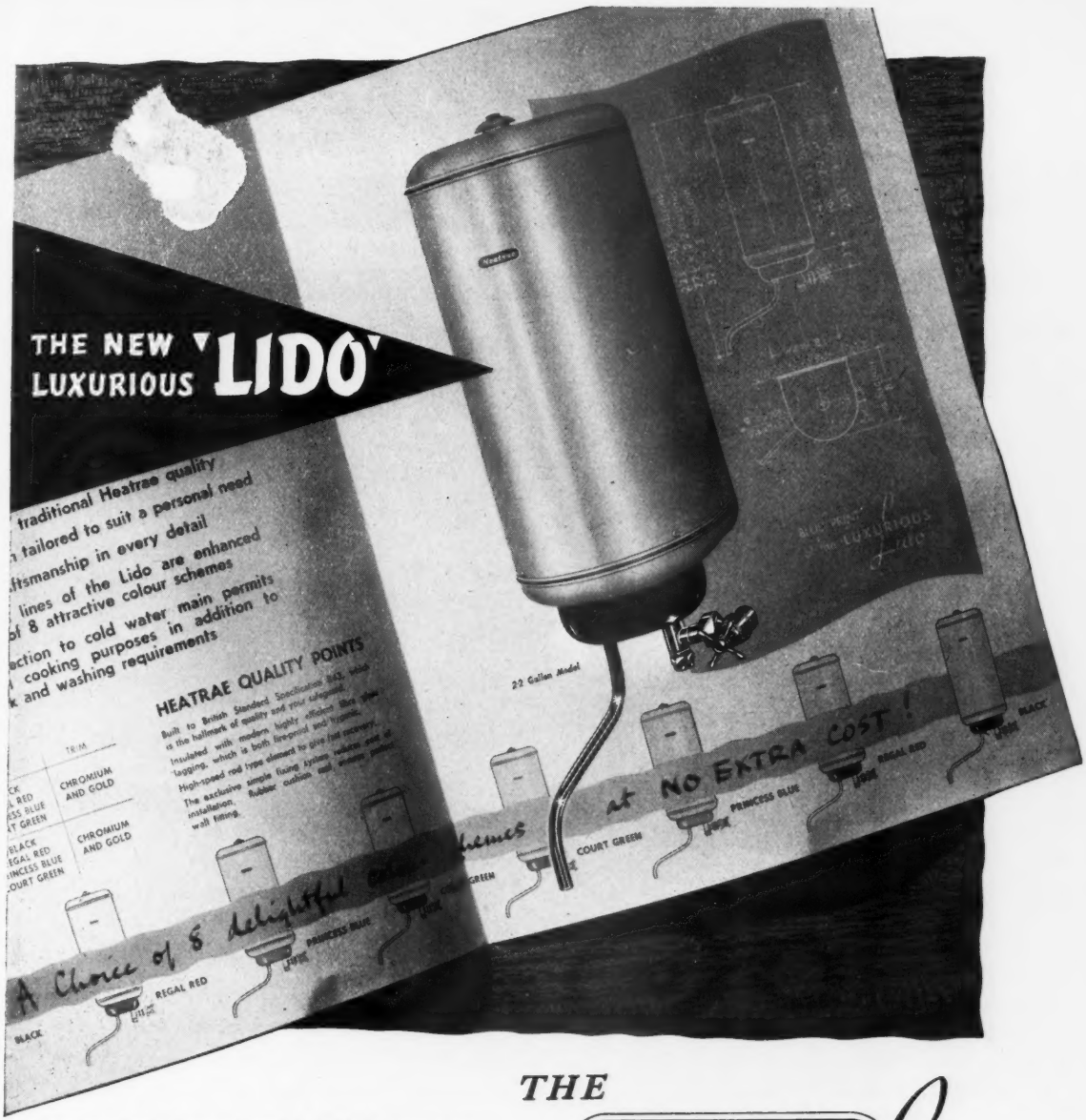
Fuses can be inspected or renewed in perfect safety. The cover can only be removed when the switch is in the ' off ' position, and then the fuse contacts are completely isolated from the incoming supply.

Two patterns are available, for flush or surface mounting.

MEM

Send for illustrated leaflet No. 365(X)

MIDLAND ELECTRIC MANUFACTURING COMPANY LIMITED · TYSELEY · BIRMINGHAM 11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lines of the Lido are enhanced
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cooking purposes in addition to
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HEATRAE QUALITY POINTS
Built to British Standard Specification 843, which is the hallmark of quality and your safeguard.
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CHROMIUM AND GOLD
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A Choice of 8 delightful
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Note the following advantages:—

- Equipment complies with the British Standard Code of Practice "Electrical Fire Alarms"
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- Can be connected to the local Fire Station.
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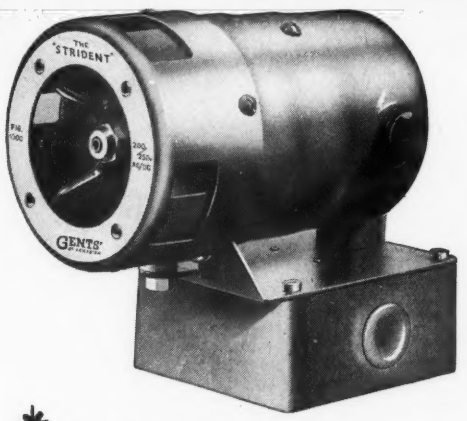
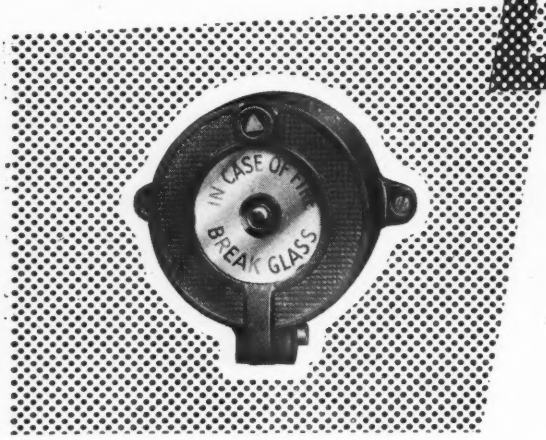


✱ **The 'STRIDENT' Syren**



The Fig. 1109 Contact illustrated above is especially suited for use in conjunction with the "Strident" syren. "Break the Glass" type, finished red enamel. Tapped for ¾" conduit. Three "Strident" syrens can be controlled by this contact. **Price £2 • 11 • 8**

✱ This syren is especially suitable for overcoming high industrial noise levels. High frequency (800 c.p.s.) with audibility range approximately three-quarter mile. Totally enclosed motor for indoor use, continuously rated. Low current consumption .75 amp. approximately. Very compact — measures only 5½" long x 5⅜" high x 3½" wide. Base box drilled for ¾" conduit on opposing sides for through wiring and fitted with knockouts. Base box can be turned through 90° to conform to conduit run. Finished red enamel.

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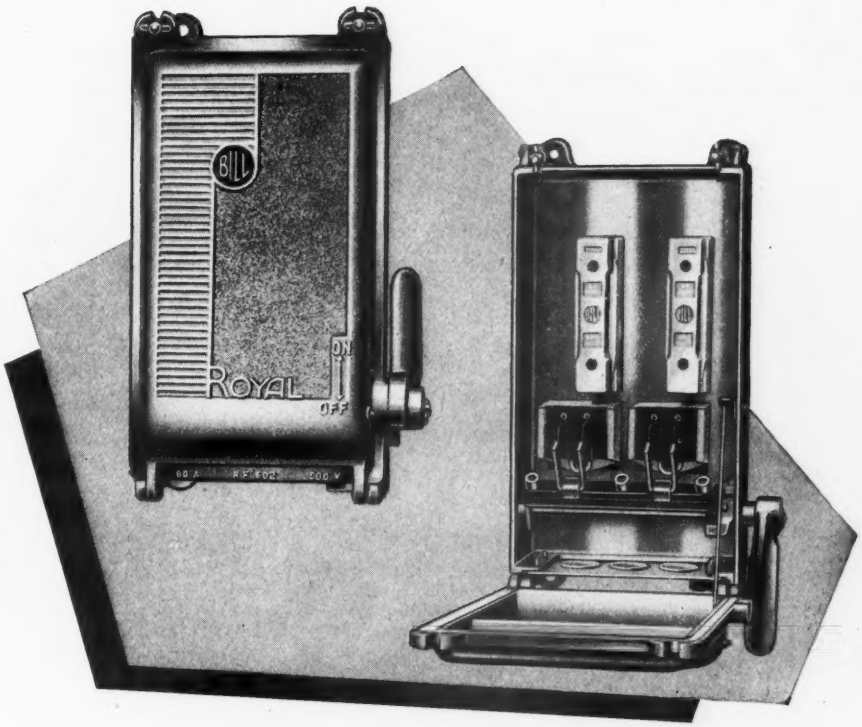

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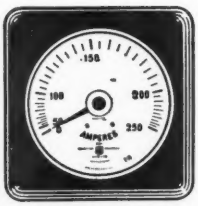
The score for the Pastoral Symphony is a detailed specification that is set down in a precise notation. Specific though the score be, its interpretation can vary considerably and that is why every discriminating music-lover looks for the name of the conductor before booking his seat for a performance. That is true of music, you may say; but surely electrical instruments can be specified *completely?* They can; but they still have to be made. In this case it is the almost intuitive competence—the know-how—which plays an important part. Competence in manufacturing grows with experience and that is why, when specifying electrical instruments, it pays to look for the name of a company with a long history behind it.



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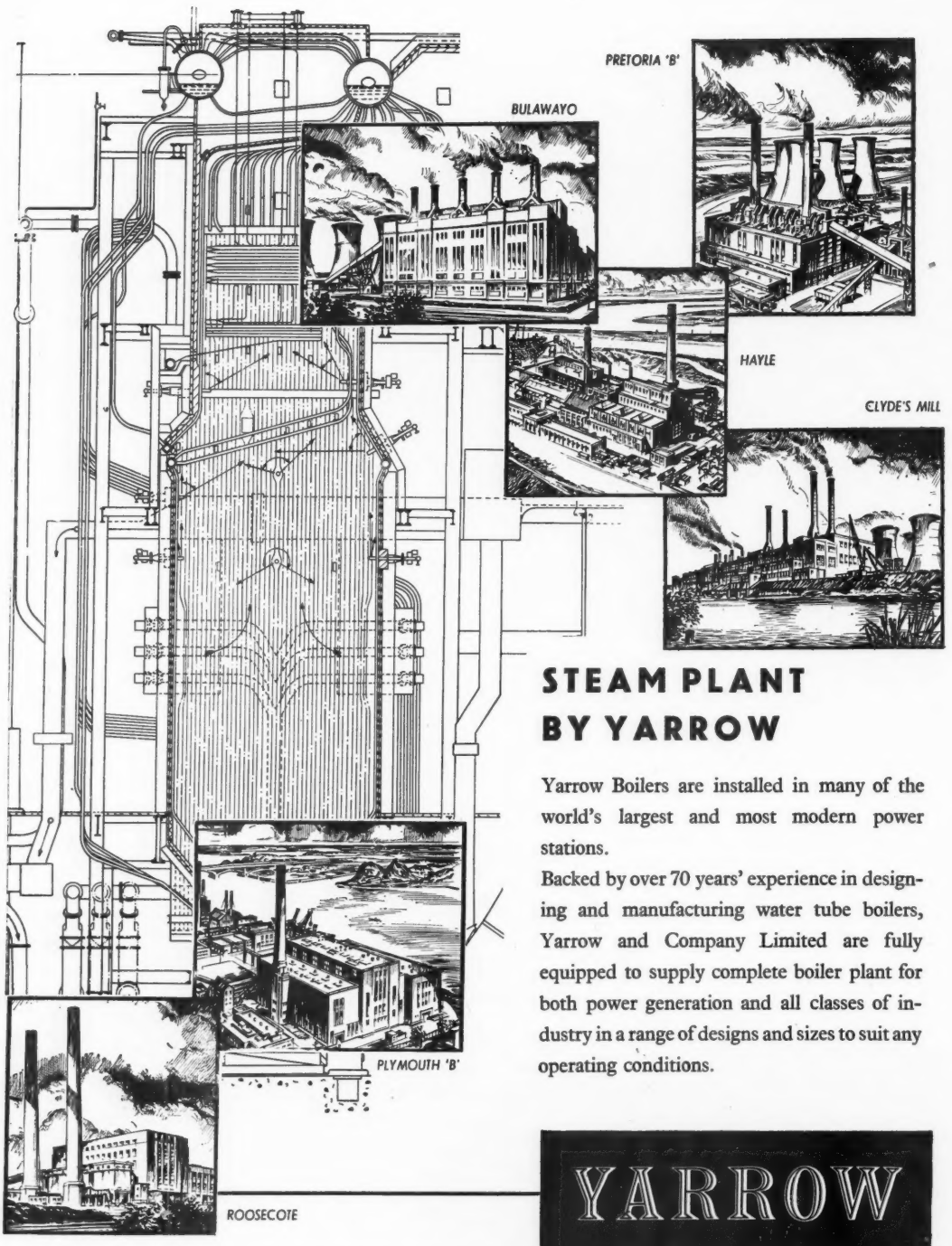

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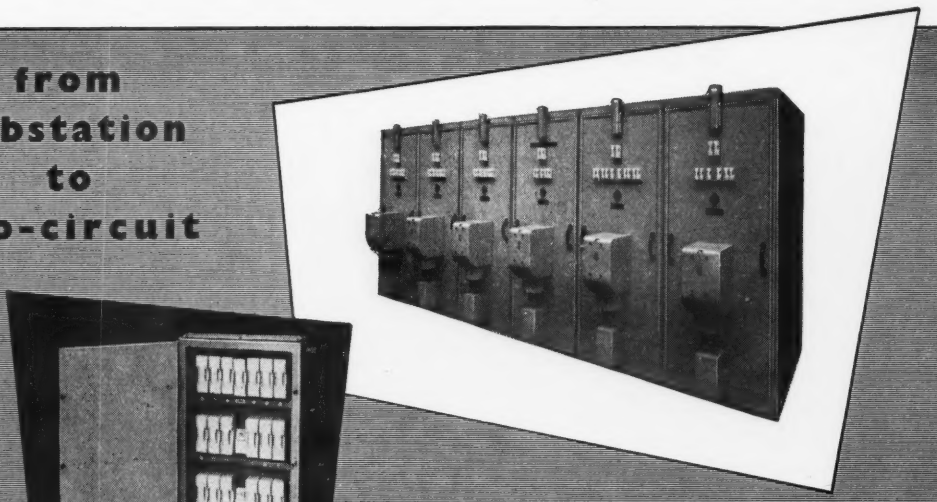

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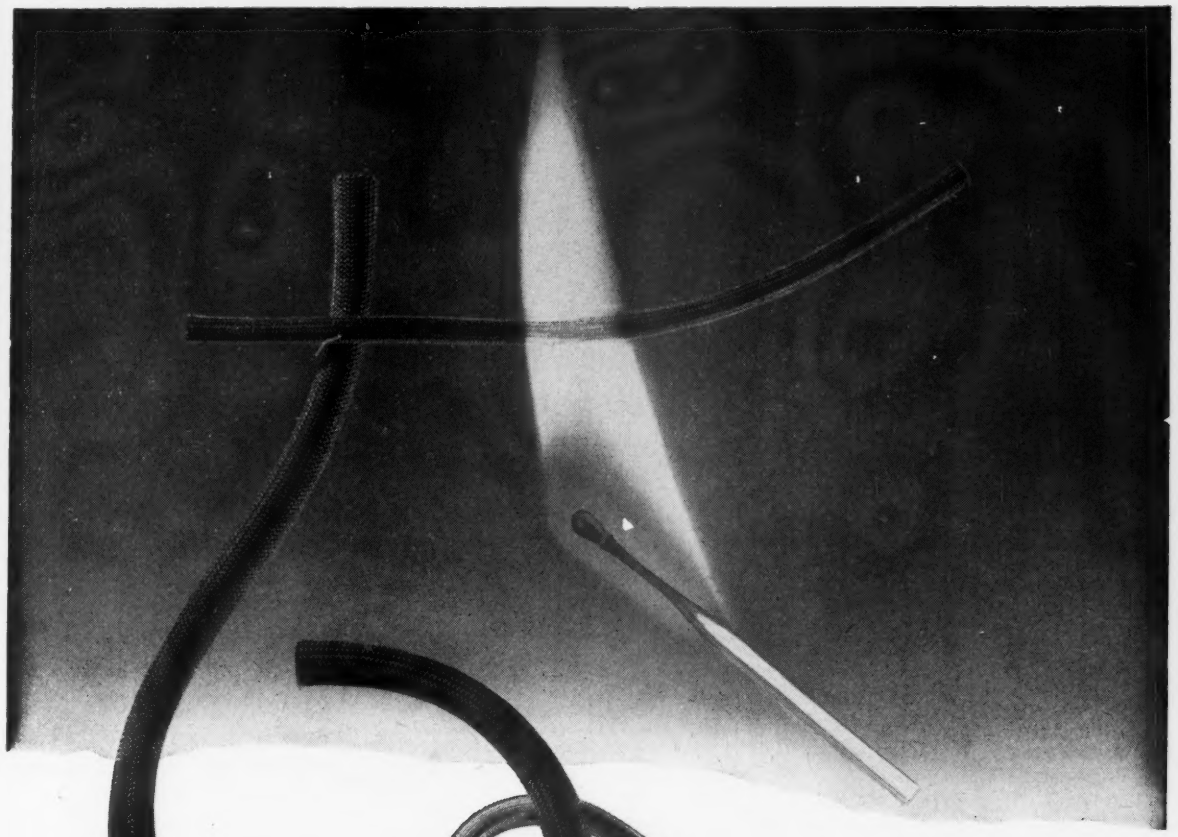

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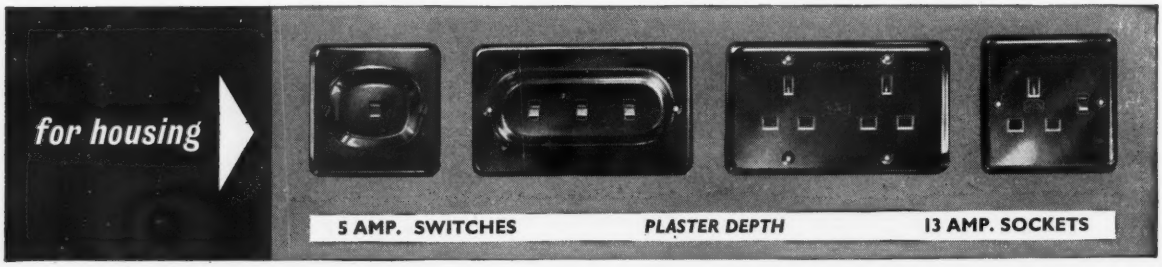
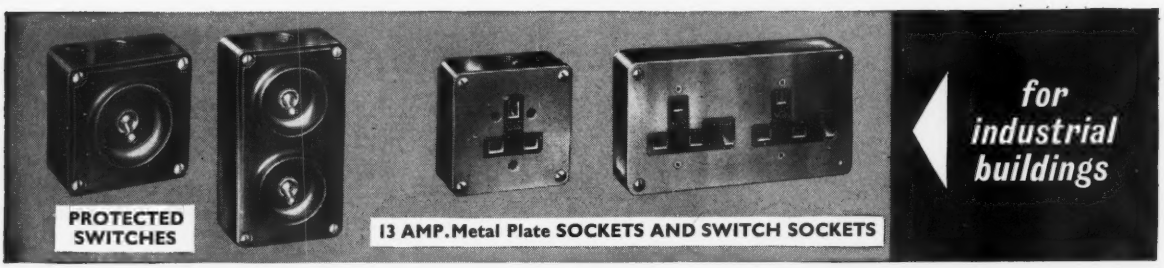


... used by Public Authorities and Government Bodies



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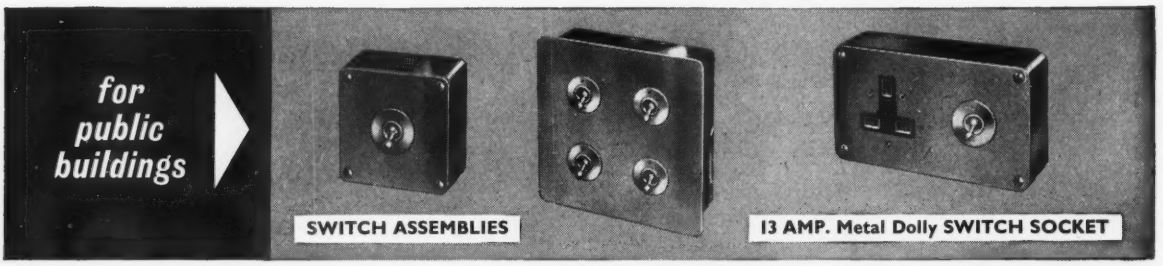
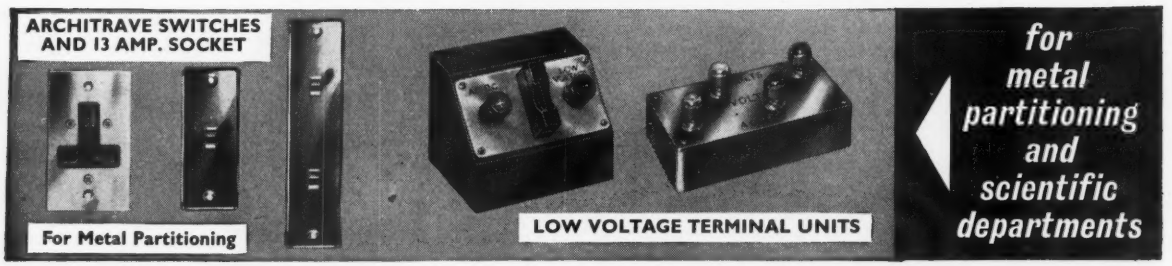


... approved by Contractors everywhere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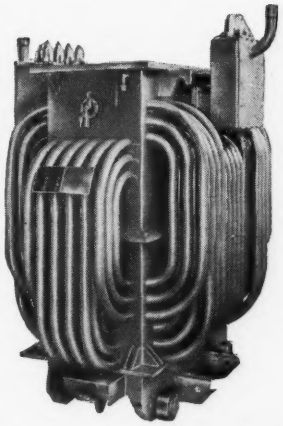

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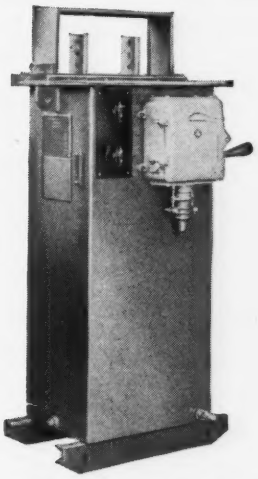

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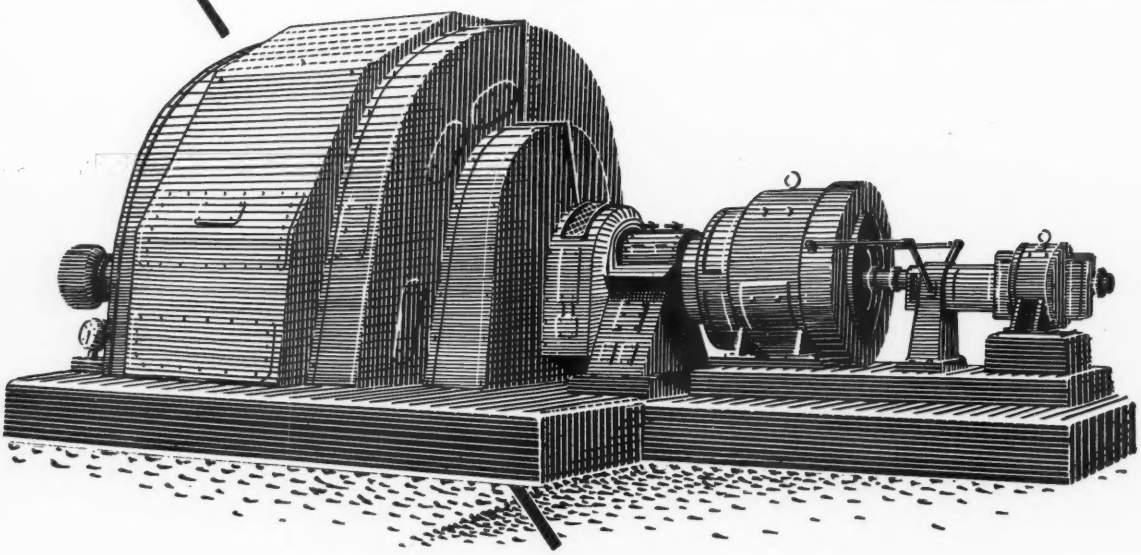

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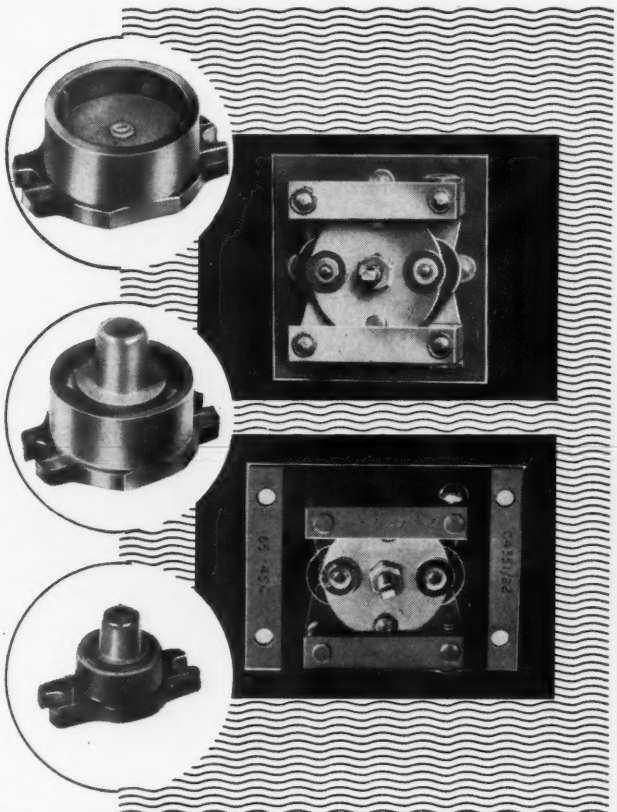

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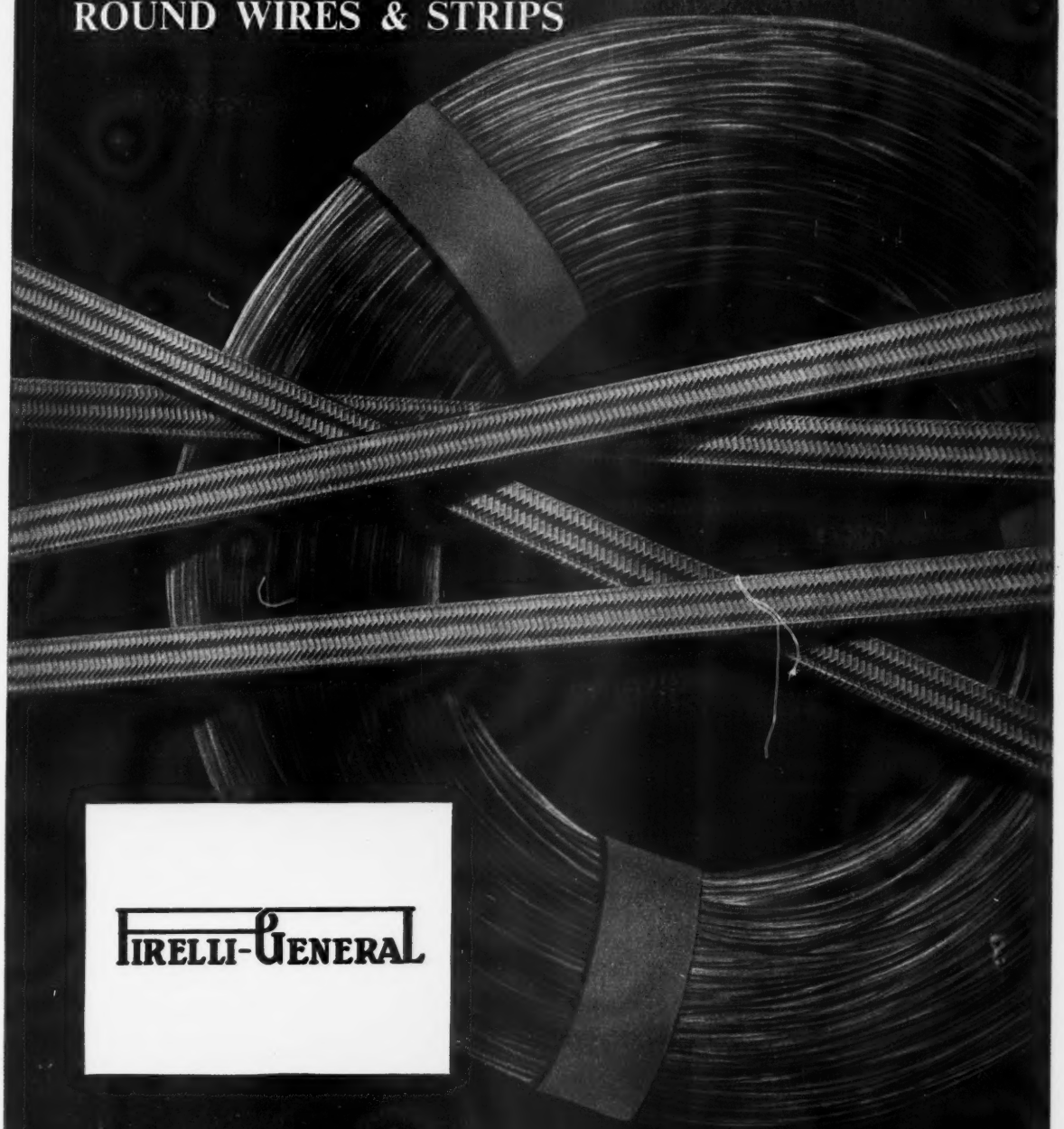
Conduits, Conduit Fittings ; Switch Units for Industrial, Commercial and Domestic Installations ; Flameproof Gear ; Lighting Fittings ; Cable Trunking Systems.

WALSALL CONDUITS LTD. **WEST BROMWICH**

PIGEGLAS

varnish bonded glass covered
ROUND WIRES & STRIPS



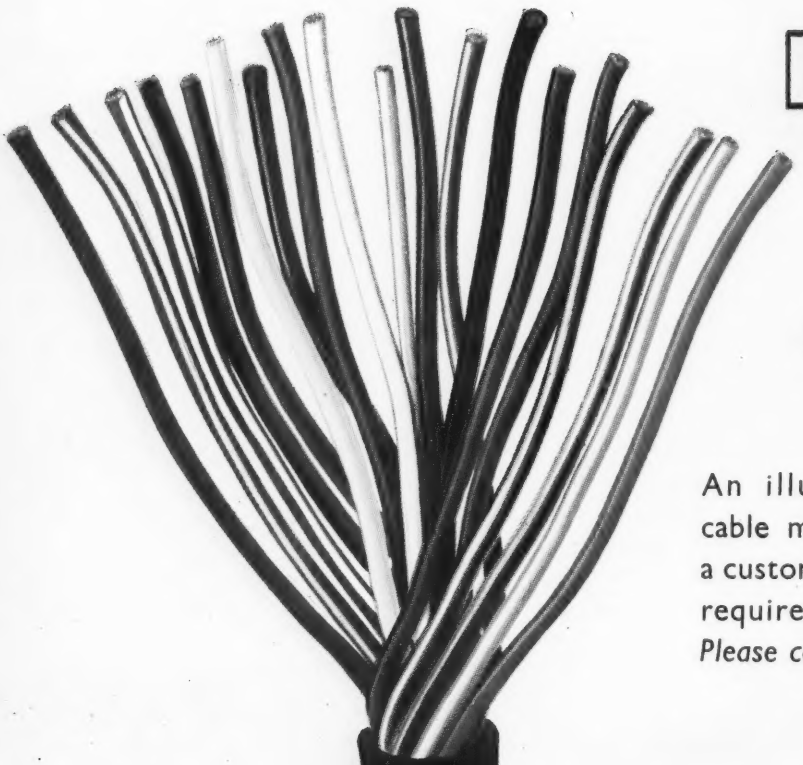
PIRELLI-GENERAL

A QUALITY PRODUCT by PIRELLI-GENERAL CABLE WORKS LTD.
SOUTHAMPTON, ENGLAND

Associate Company of The General Electric Co. Ltd.

B

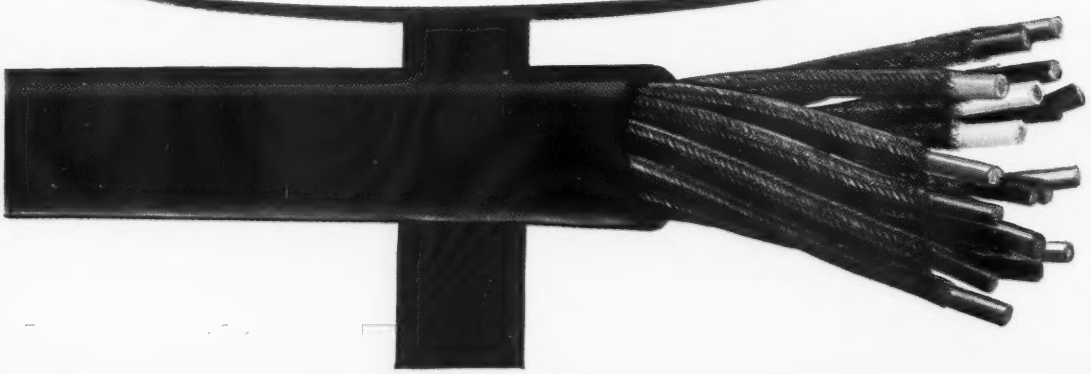
RISTS



An illustration of a cable manufactured to a customer's particular requirements.
Please consult us

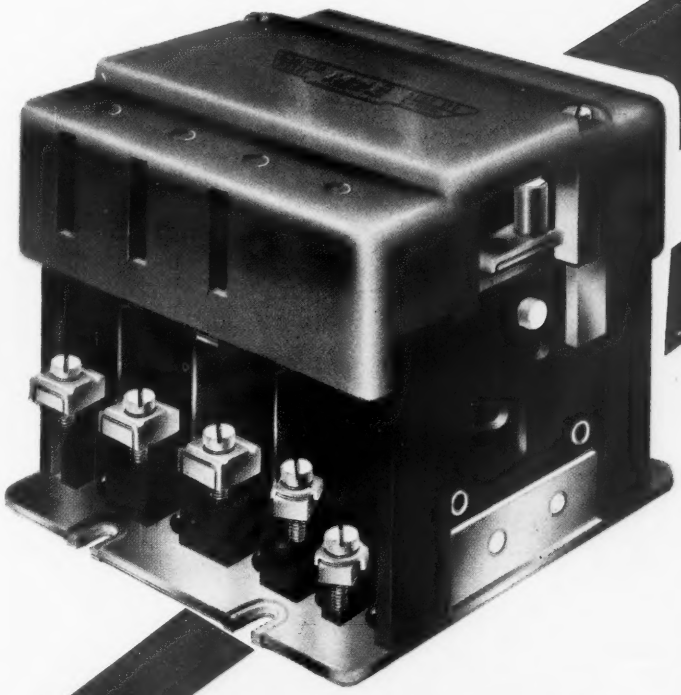
A similar cable to the above, but each core metal sleeved. We are always pleased to make up specifications, however peculiar your needs may be.

RISTS WIRES & CABLES LTD
LOWER MILEHOUSE LANE NEWCASTLE STAFFS



PROGRESS CONTROL **MTE** RANGE GEAR

Design Engineers!



Here is a complete range of **A.C. CONTROL GEAR COMPONENTS** available for immediate delivery!

Specifically designed for machine tool control, automation projects and all applications demanding long life and absolute dependability.

CONTACTORS - MULTI-POLE RELAYS
ELECTRO-PNEUMATIC TIMERS
THERMAL AND MAGNETIC OVERLOADS
INTERLOCKING ISOLATORS
PUSH BUTTON STATIONS
"MULTI-LOCK" TERMINALS

Write for full particulars and illustrated brochure No. A657

MTE Control Gear Limited

LEIGH-ON-SEA ESSEX

Telephone: EASTWOOD 54281 (10 lines)
Telegraphic Address: ELECTRICS, LEIGH-ON-SEA

MIDLAND BRANCH OFFICE: 47 WARWICK ROAD, COVENTRY. *Telephone: Coventry 64561*

G.E.C.

meeting every requirement for medium voltage switch and fuse gear

This equipment is designed and manufactured to every relevant British Standard.

It is renowned for :—

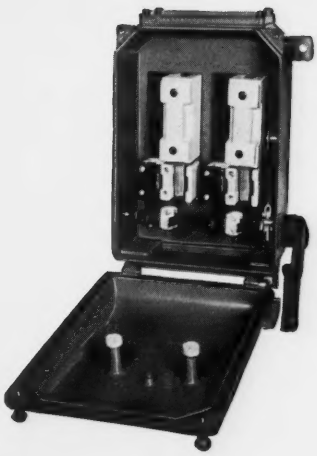
- CLEAN DESIGN
- EASE OF INSTALLATION AND MAINTENANCE
- SMOOTH ACTION
- RELIABILITY AND LONG LIFE

THE GENERAL ELECTRIC CO., LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

for
general industrial
application

MW
range

for
heavy industry &
exposed situations

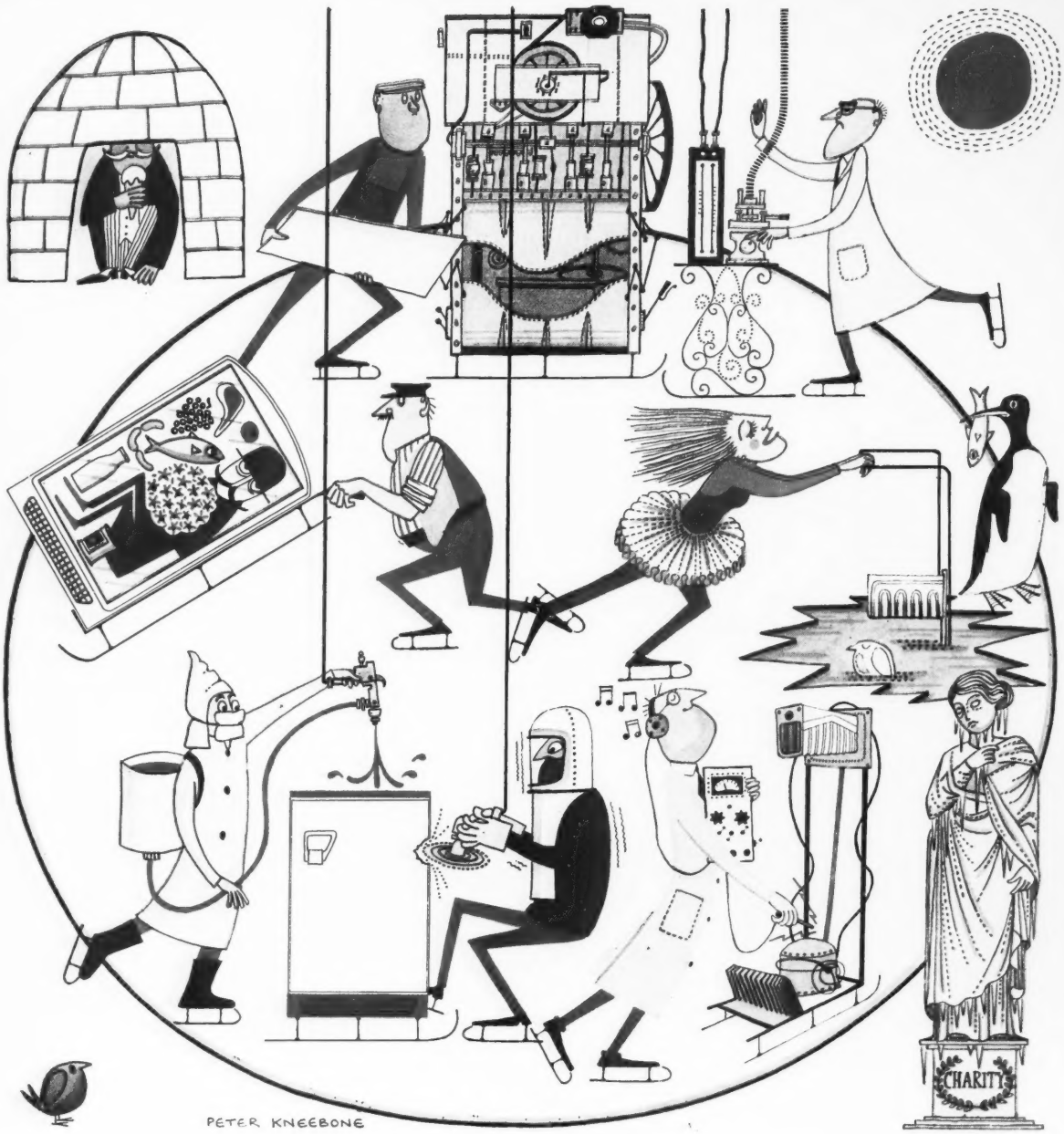


HW
range

for
domestic installation

DW
range

Always use *G.E.C.* H.R.C. fuse links



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REFRIGERATORS

For every modern industrial process there is a specialised grade of Sea Shell Lubricant.

SHELL

leadership in lubrication

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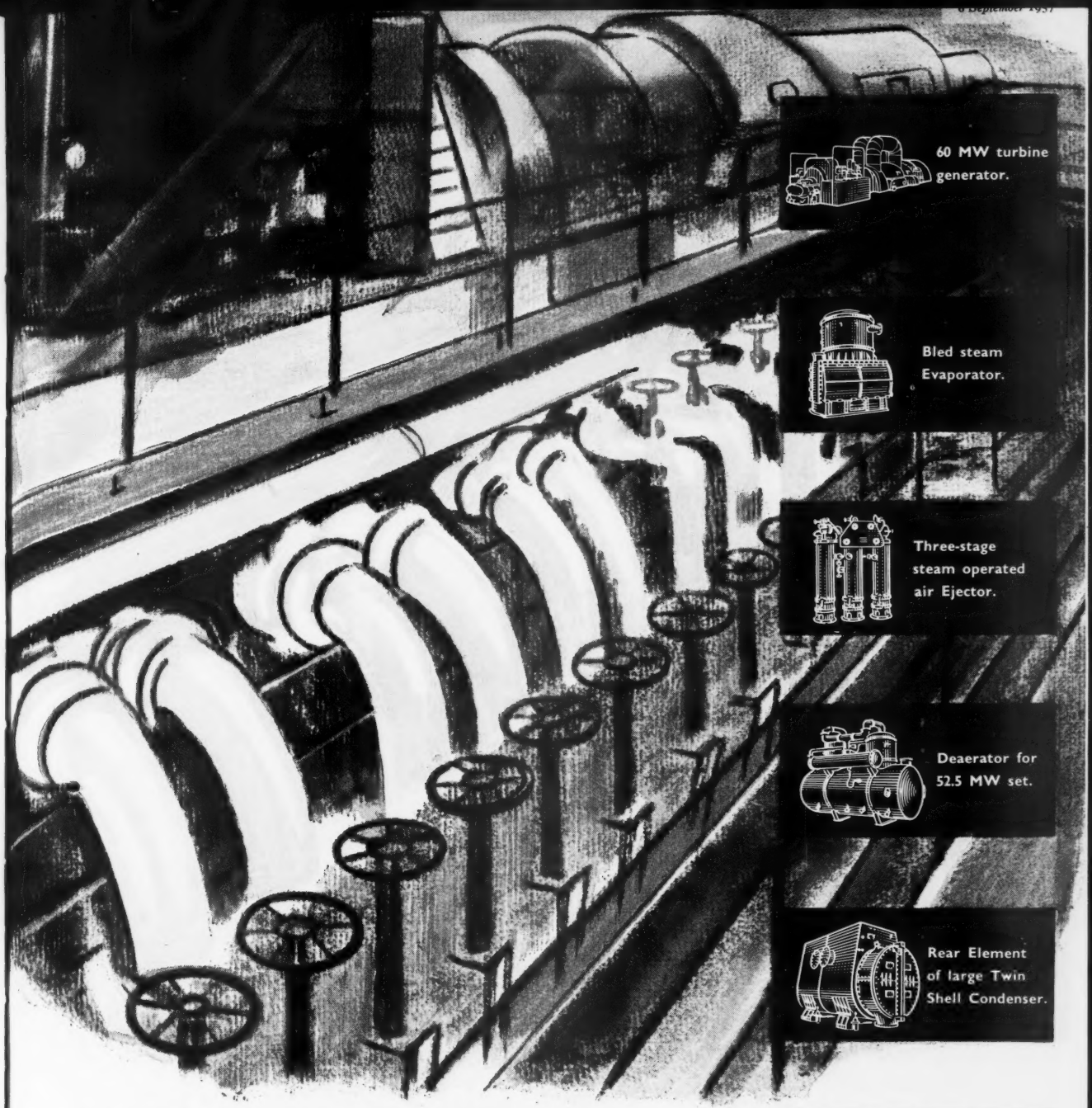


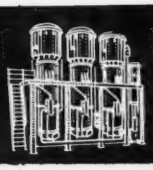
60 MW turbine generator.

Bled steam Evaporator.

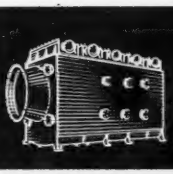
Three-stage steam operated air Ejector.

Deaerator for 52.5 MW set.

Rear Element of large Twin Shell Condenser.



Thermo-compressor type Evaporator.



Motor-Compressor intercooler.

TURBINE FEED HEATERS for regenerative feed water heating were introduced by Metropolitan-Vickers in 1916, and more than one thousand have since been put into service by the Company, with power station plant in many parts of the world.

The bled steam feed-water heater is but one item in the comprehensive range of heat exchange apparatus manufactured by Metropolitan-Vickers for all types of thermal power plant.

METROPOLITAN-VICKERS

ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER, 17

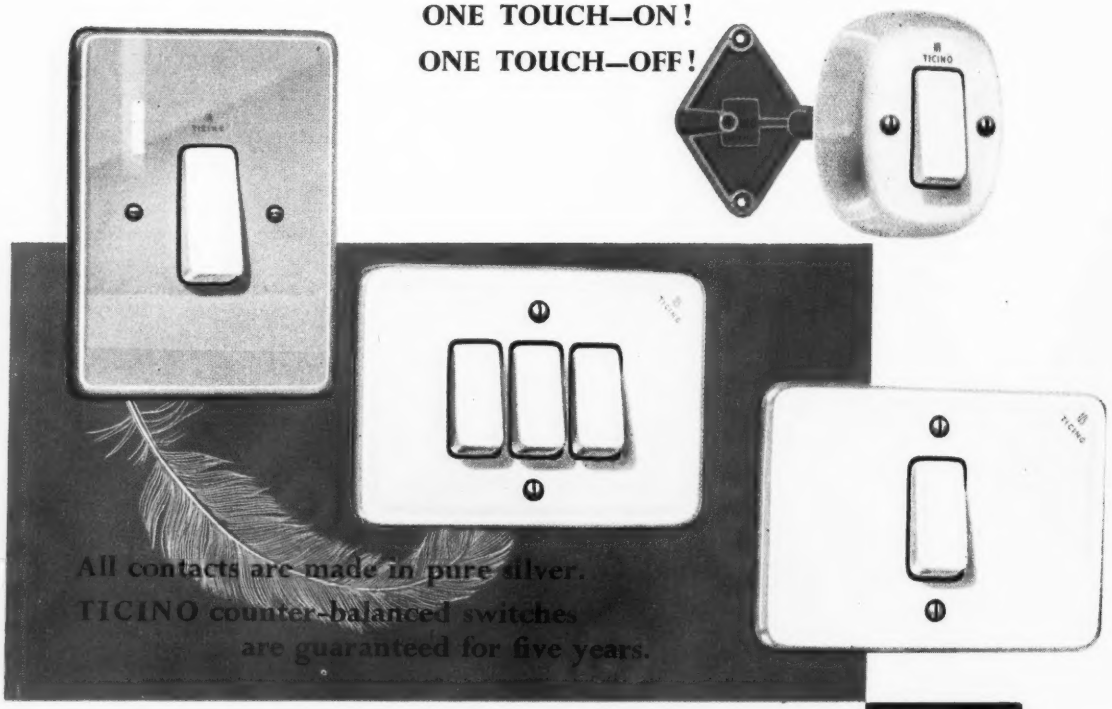
An AEI Company

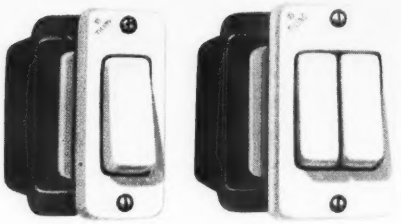
B/A 603

Contemporary **TICINO**

FEATHERLIGHT SWITCHES

ONE TOUCH—ON!
ONE TOUCH—OFF!





TICINO
INTERRUTTORI
ELETTRICI
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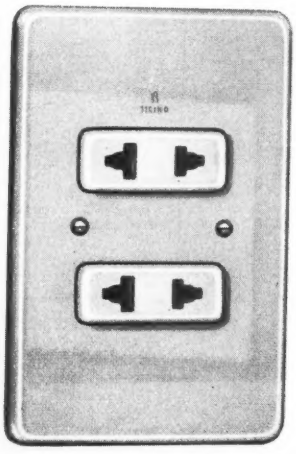

A wide selection of flush switches

ONE, TWO OR THREE WAY SWITCHES
IN DE LUXE OR STANDARD MODELS.
STANDARD U.S.A. AND MINIATURE TYPES

Representatives for Great Britain and Ireland
S.E.L.L. *(Prop. SAMS ELECTRICAL (London)* LTD.)
AFRICA HOUSE, KINGSWAY, LONDON, W.C.1. *CHAncery* 8081/3

CVS-205

BOLTON'S H.C. COPPER BUS-BARS

THOMAS BOLTON & SONS LTD

Up to 10 inches wide by 1 inch thick or 3 inches square, drawn finish; up to 12 inches by ¾ inch by 16 feet, hard rolled. Extra heavy machined bars to customer's requirements. Tubular and laminated Bus-Bars.

PRE-ASSEMBLY WORK ON BUS-BARS

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Telephone: Regent 6427/8/9. Telegrams: "Wiredrawn, Piccy, London"
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BSS 7
VIR T.B.&C.
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VIR HSOS
VIR LEAD COVERED
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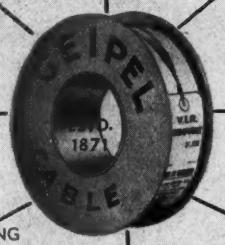
BSS 638 WELDING

BSS 883 SHIP WIRING



BSS 1116 QUARRIES

BSS 708 COALMINING

BSS 559 NEON LIGHTING

BSS 2004 PVC

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THERMOPLASTIC

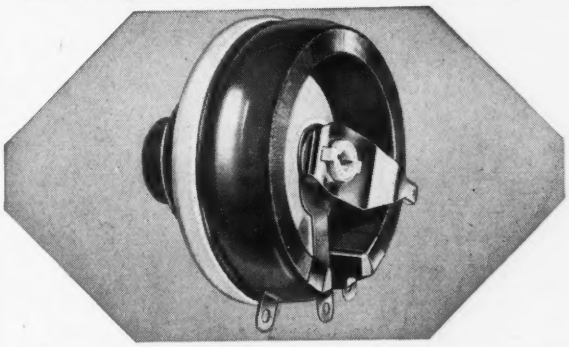
MADE AND TESTED TO BRITISH STANDARD SPECIFICATIONS

WILLIAM GEIPEL LTD.
HEAD OFFICE: 156-170 BERMONDSEY ST · LONDON · S.E.1
CABLE WORKS, WEMBLEY

C

TOROSTATS

Toroidally Wound Potentiometer-Rheostats



CRESSALL TOROSTATS are a particularly robust form of vitreous enamelled toroidal potentiometer on a ceramic base. This construction gives great mechanical strength and good heat dissipation. Cressall contact brush design ensures perfect contact with negligible wear.

made by

Cressall

THE CRESSALL MANUFACTURING COMPANY LIMITED
(A subsidiary of The Expanded Metal Co. Ltd.)
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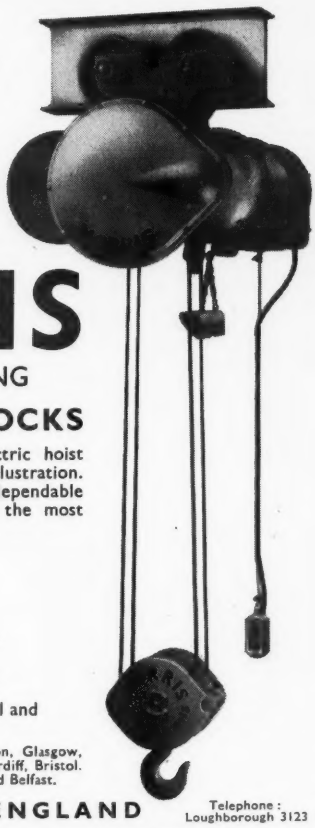
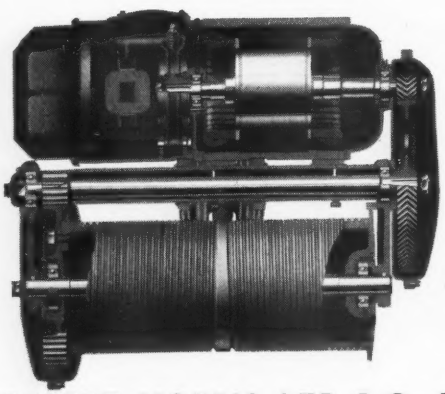
HOISTING WITHOUT A HITCH!



WHY TAKE A CHANCE?
INVEST IN A MORRIS
AND BE SURE!



MORRIS

ALL-BRITISH BALL-BEARING

ELECTRIC HOIST-BLOCKS

The simple arrangement of the Morris electric hoist block is at once apparent in our sectional illustration. This has proved to be highly efficient and dependable to thousands of users already, even under the most adverse conditions.

Notable features include

Totally enclosed detachable motor.
Powerful electro-mechanical brakes.
Robust contactor adequately protected.
High grade precision ball-bearings on all shafts.
Grease gun lubrication throughout.
Welded steel frame for lightness and strength.
Sizes ¼, ½, 1, 2, 3, 5, 7½ and 10 tons.
Types for suspension, push travel, geared travel and electric travel are available.

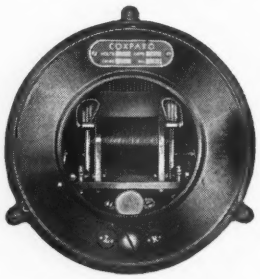
Resident engineers available for consultation in London, Glasgow, Manchester, Birmingham, Leeds, Sheffield, Newcastle, Cardiff, Bristol. Dundee, Liverpool, Nottingham, Bury St. Edmunds and Belfast.

HERBERT MORRIS LTD P.O. Box 7 LOUGHBOROUGH ENGLAND

Telephone: Loughborough 3123

Automatic

VOLTAGE REGULATORS



The COXPARO will "Smooth things out"

- SUITABLE FOR A.C. AND D.C. MACHINES
- ACCURATE TO ± 1% OR LESS
- SIMPLE EFFECTIVE DESIGN
- COMPLETELY SELF CONTAINED
- CONTROL KNOB PROVIDES ± 10% OF DECLARED VOLTAGE
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COX-WALKERS LTD.

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Say BLACKLEY

Ask for the Original Insulating Tape manufactured by: CONNOLLYS (BLACKLEY) LTD
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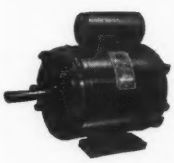
G·E·M MOTORS *of Quality*

SINGLE AND THREE-PHASE

FOOT OR FLANGE MOUNTED



G.E.M. Motors cover the complete range of Ventilated Drip-Proof and Totally Enclosed Units from ¼ h.p. to 1½ h.p.
Quick deliveries—Most types from stock. Export inquiries invited.

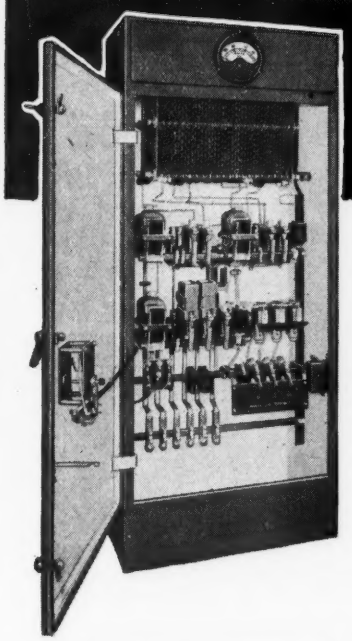
We also make bench polishers and grinders.

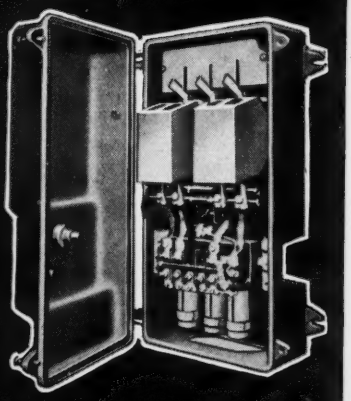
GILL ELECTRIC MOTORS

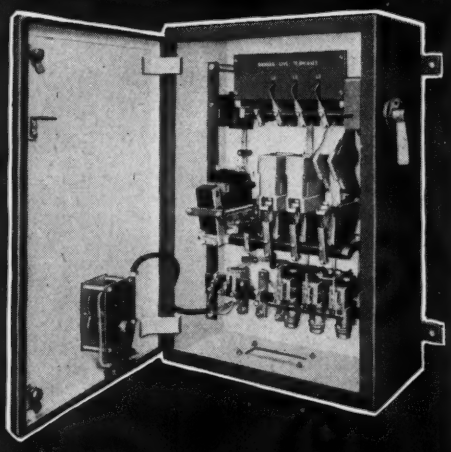
46-49 High Street, BRIGHTON. *Phone: Brighton 22970*

"ERSKINE HEAP"

CONTACTOR STARTERS







We manufacture contactor starters of the direct-on, star delta or auto-transformer pattern for controlling squirrel cage motors, and of the stator and rotor pattern for controlling slip ring motors.

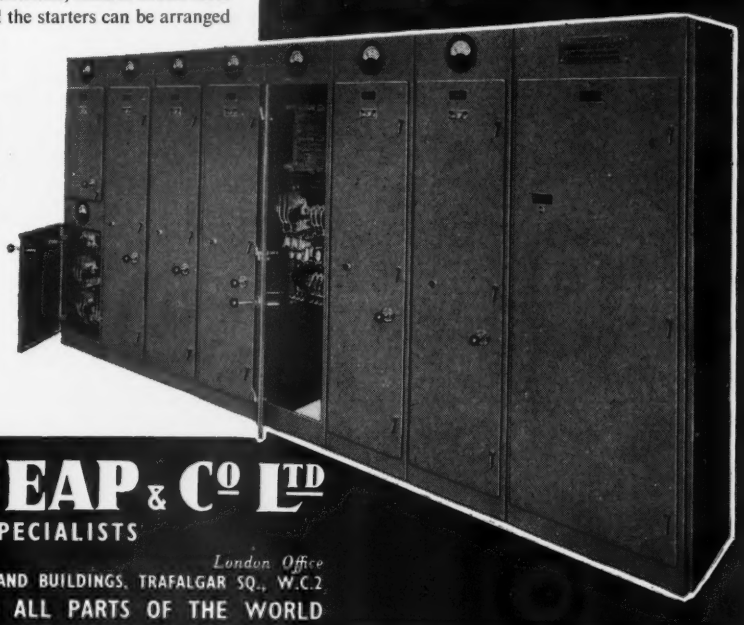
All overloads are of the accurate solenoid type, and above 10 H.P., powerful magnetic blowouts are incorporated. The contactors are mounted on bakelised steel bars and constitute a completely independent unit ready to be mounted in any frame, case or cubicle, and for any combination of equipment.

All contactors can be supplied either with or without fully interlocked isolating switch. All accessories such as 'hand' 'off' 'auto' switches, control circuit fuses and instruments can be mounted as required, and the starters can be arranged suitable for 'local' or 'remote' control or to be operated by float switches, pressure gauges, thermostats, etc.

WE ALSO MANUFACTURE

ALL TYPES OF HAND-OPERATED AIR-BREAK & OIL-IMMERSED STARTERS AND MOTOR CONTROL GEAR

The multi-motor panel type Switchboard illustrated (right) is one of many supplied to one of the leading petroleum companies.



ERSKINE, HEAP & Co LTD

SWITCHGEAR SPECIALISTS

Head Office & Works
BROUGHTON, MANCHESTER (7)

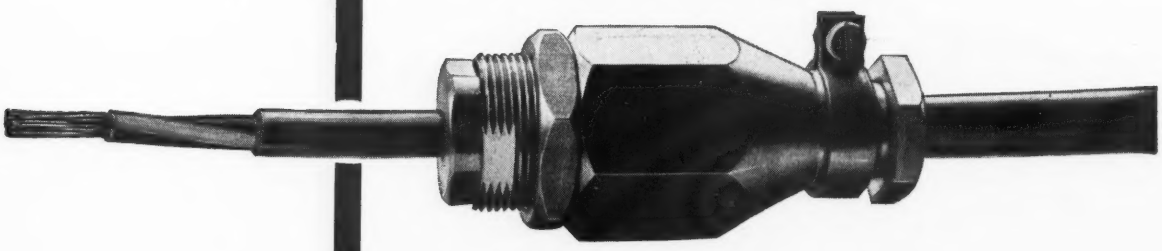
London Office
GRAND BUILDINGS, TRAFALGAR SQ., W.C.2

BRANCH OFFICES AND AGENCIES IN ALL PARTS OF THE WORLD

725

made for each other...

AERIALITE ★ ARMOURED CABLES AND GLANDS



These Cables are also supplied with P.V.C. insulation to B.S. 2004, 1955 (as far as applicable).

★ available with Polythene insulation, single or double galvanised steel armouring P.V.C. sheathed overall. Manufactured to B.S. 1557, 1954 (as far as applicable).

CABLE GLANDS

Cable glands are available for termination of armoured cables in the following sizes:—

SEALING TYPE (THESE GLANDS CAN BE SUPPLIED WITH EARTH STRAPS)			NON SEALING TYPE		
Part No.	Suitable for S.W.A. Cable Sizes	Conduit Thread	Part No.	Suitable for S.W.A. Cable Sizes	Conduit Thread
B602/1	3/036 3 and 4 Core 7/029 Twin, 3 and 4 Core 7/036 Twin, 3 and 4 Core 7/044 Twin	1¼"	PD 426	Up to 7/036 Twin	⅜"
			PD 427	Up to 7/036 4 Core	¾"
B603/1	7/044 3 and 4 Core 7/052 Twin, 3 and 4 Core 7/064 Twin, 3 and 4 Core	1½"	PD 428	From 7/044 3 Core to 7/052 4 Core	1"
			PD 429	From 7/064 3 Core to 7/064 4 Core	1½"
B604/1	3/029 Twin, 3 and 4 Core 3/036 Twin, and 3 Core 7/029 Twin	¾"			

Aerialite Ltd

HEAD OFFICE AND CABLE DIVISION, CASTLE WORKS, STALYBRIDGE, CHESHIRE

THE FINEST RANGE OF SMALL HORSE POWER MOTORS FOR ANY INSTALLATION

with the one-piece gearbox...

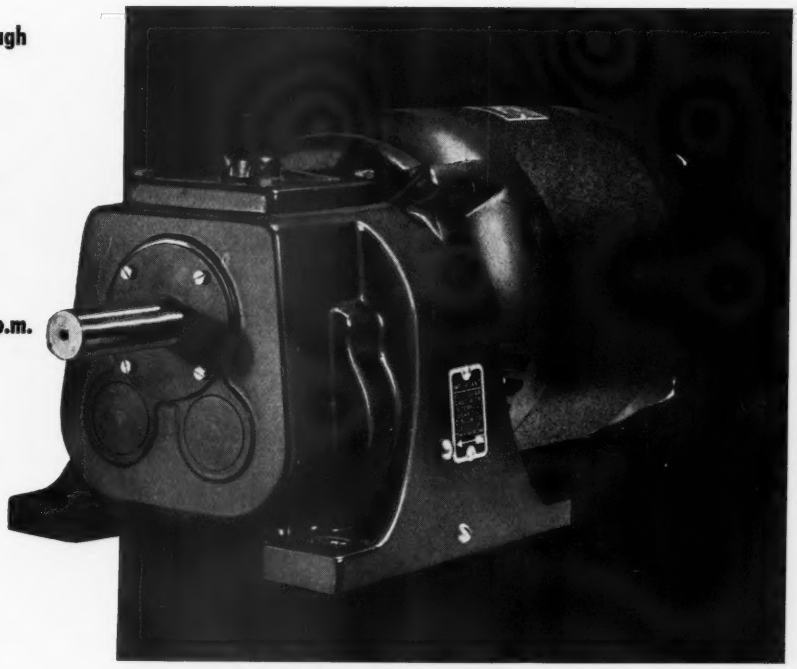
★ **strong, stiff, a box casting always properly in line**

★ **with no possible oil leaks through joints**

★ **gears transmit 200 lb. ft. at 26 r.p.m. up to 480 r.p.m.**

★ **or 100 lb. ft. between 0.66 r.p.m. and 22 r.p.m.**

★ **foot or flange mounting**



TYPE H.D. geared motors

A.C. or D.C. NECO motors of all fixed or variable speed types, made in the same factory as the gearbox, allow competitive prices and speedy delivery.

NECO TRADE MARK

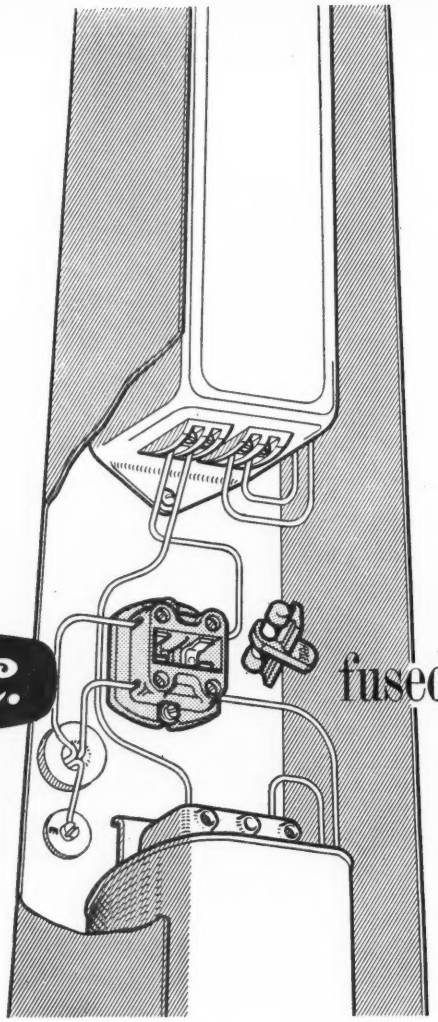
NECO GEARED MOTORS LIMITED

a non-ring firm

OLD TOWN · LONDON · SW4

SUBSIDIARY OF NORMAND ELECTRICAL CO. LTD

Telephone : MACaulay 3211-4



G.E.C.

fused mains terminal blocks

save
time
manhours
and
money

Individual circuit protection at **no extra cost**

Quick identification of faulty fittings

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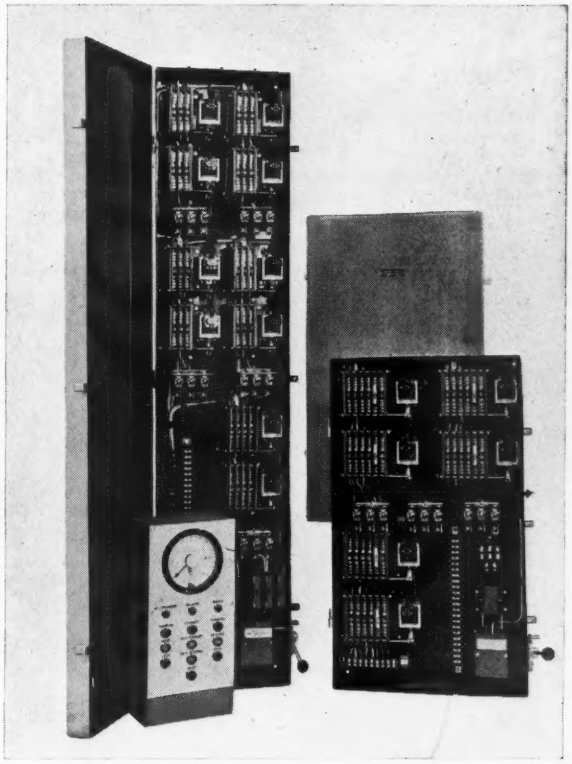

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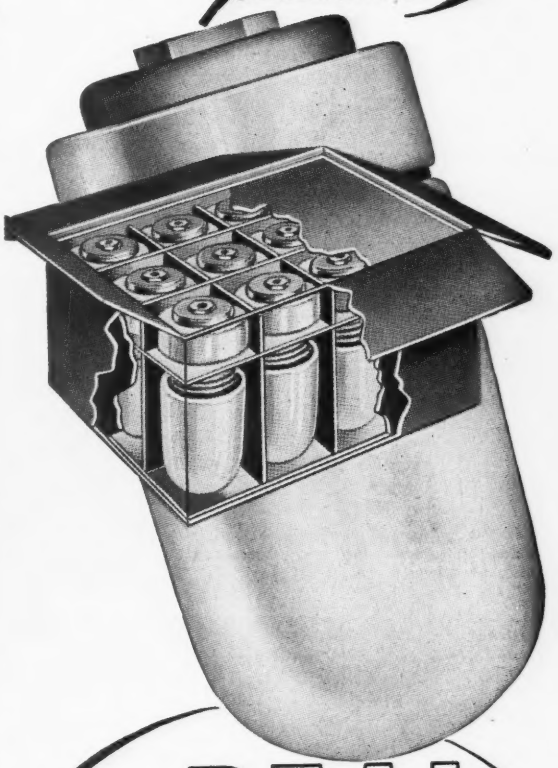

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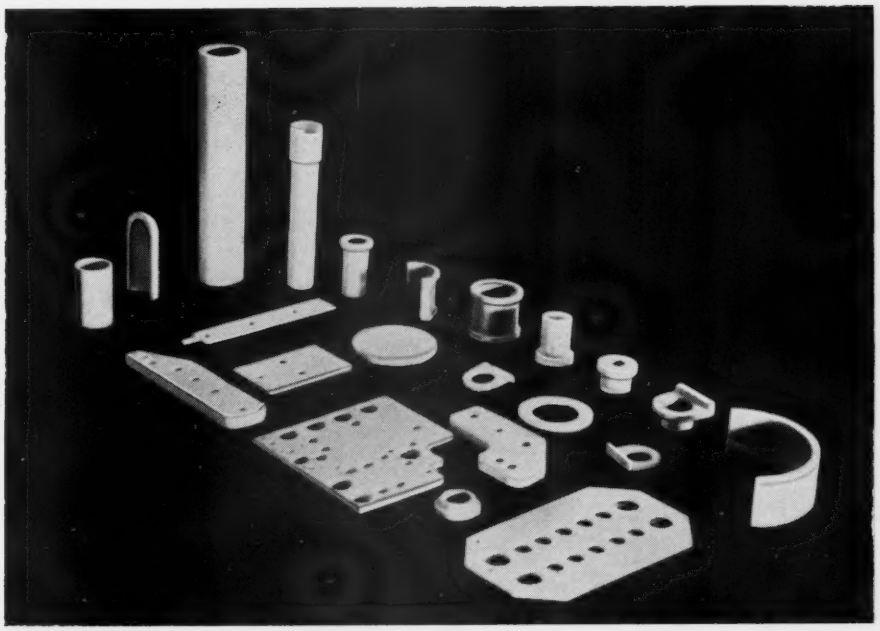

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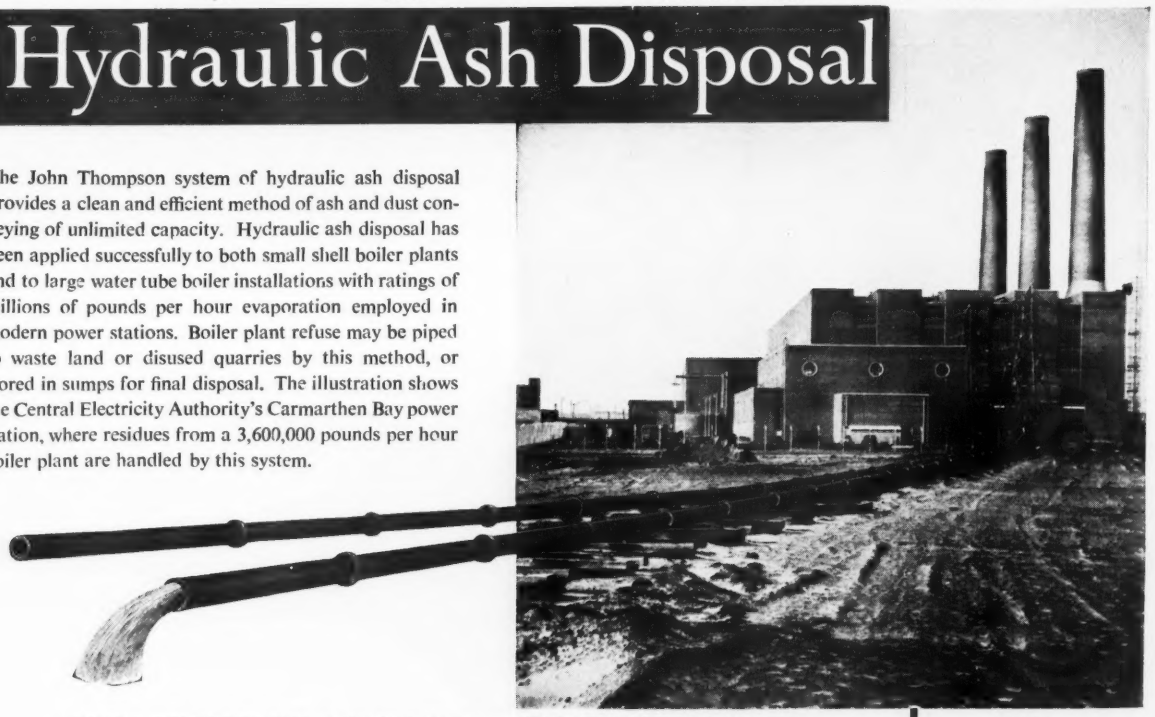

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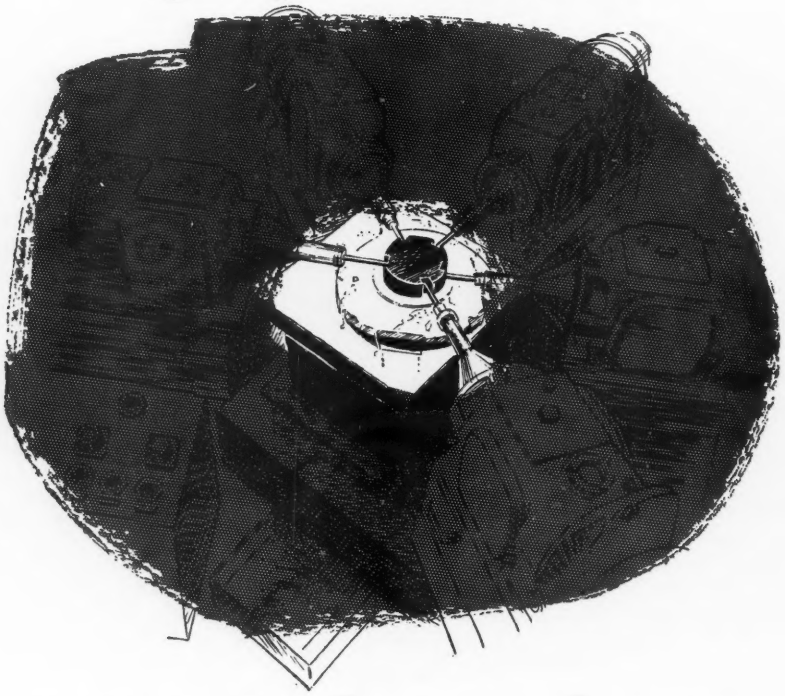

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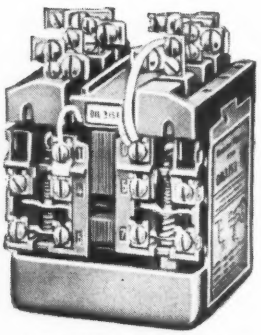

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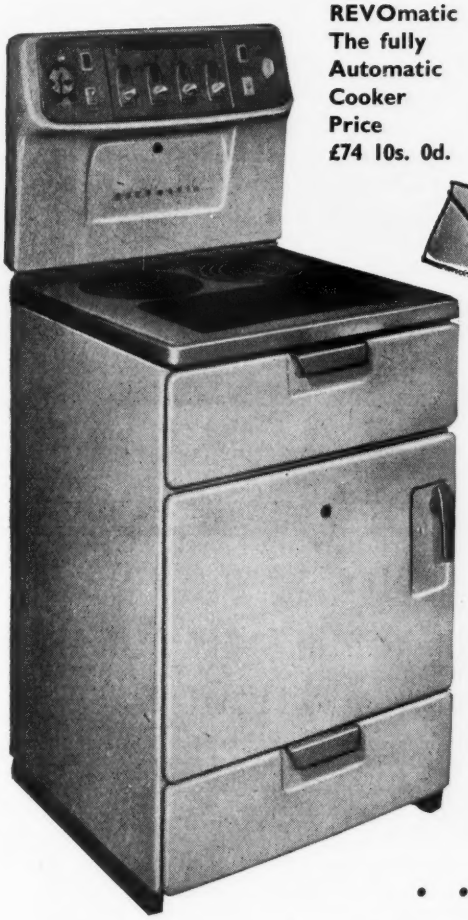

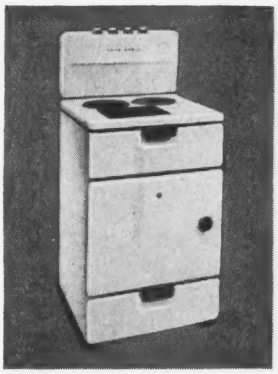

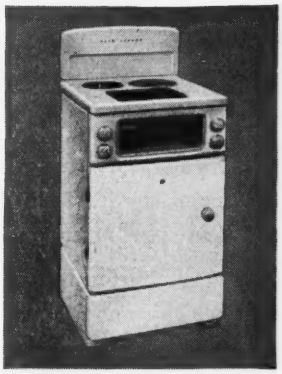

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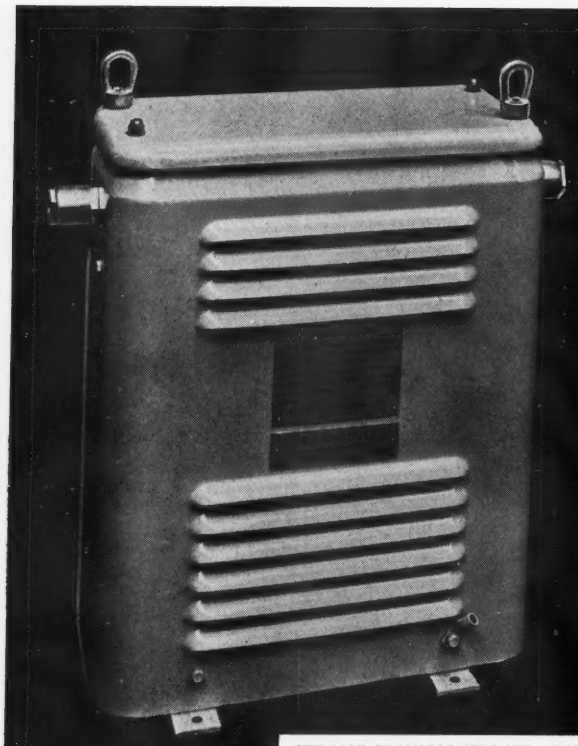

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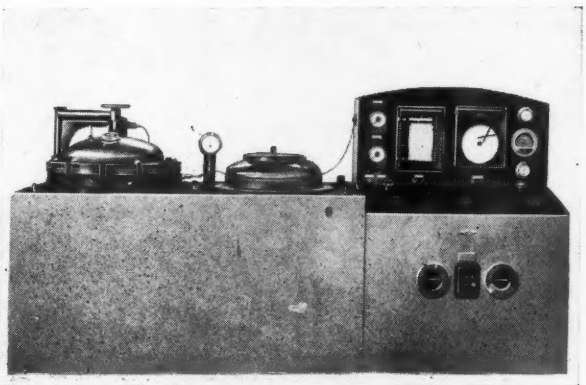

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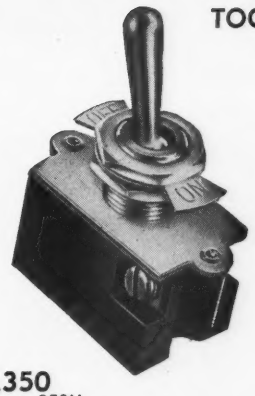

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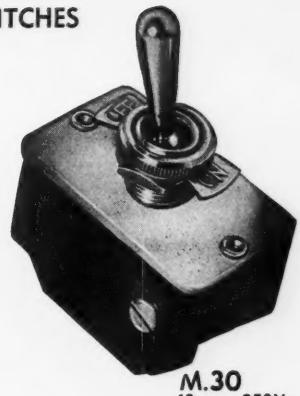

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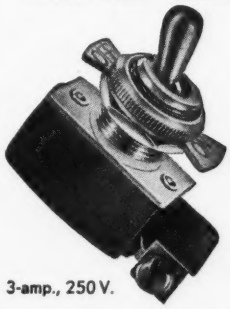

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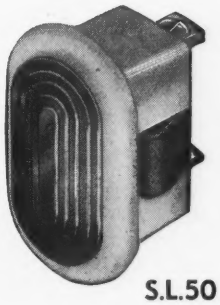

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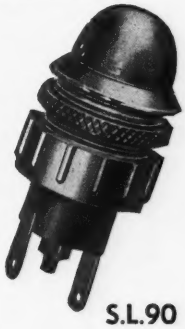

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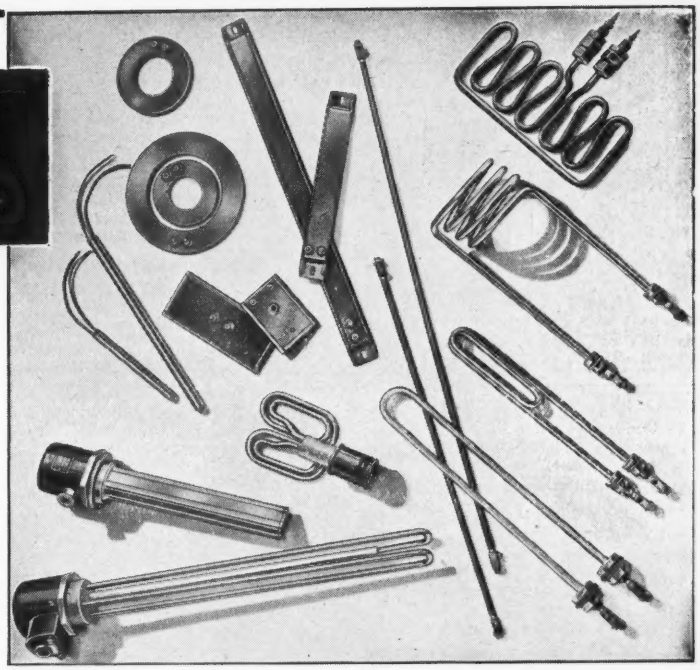

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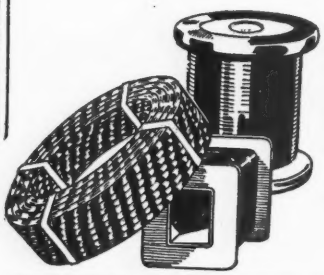

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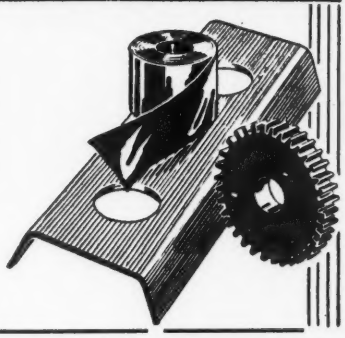

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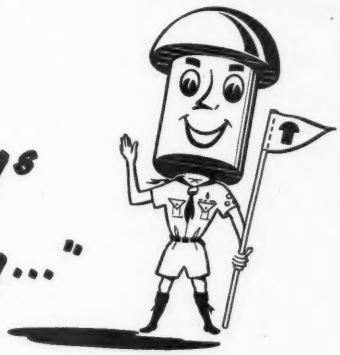

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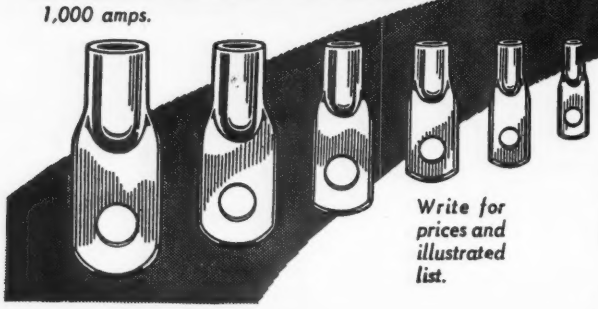

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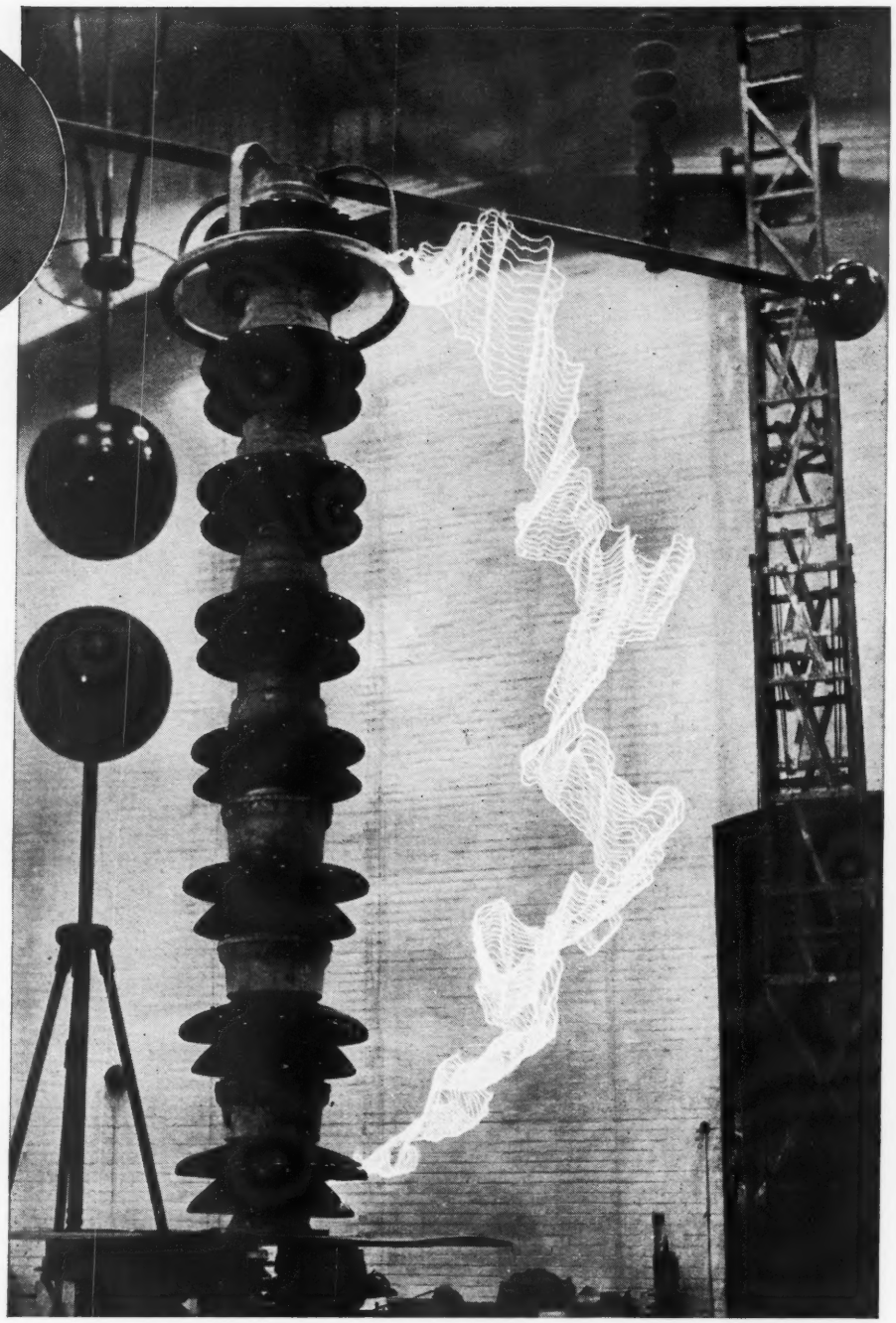

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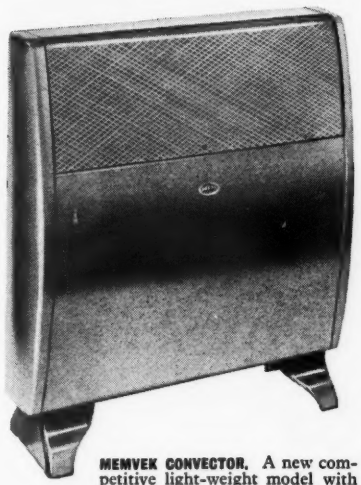

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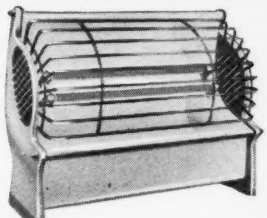
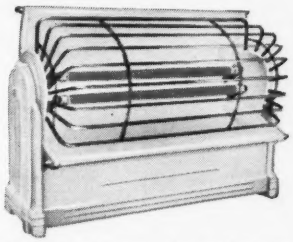


REFLEX offers outstanding value in a simple well-designed reflector fire. Chromium plated brass reflector. Made in 1 and 2 kW sizes.



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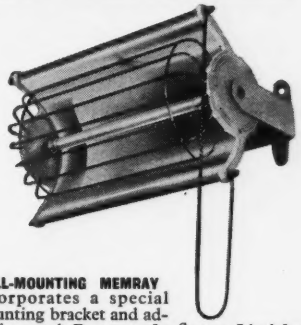

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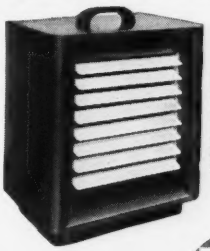

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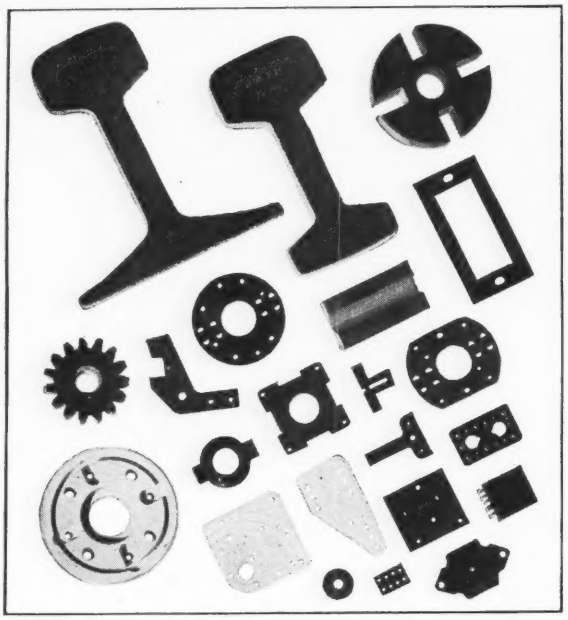

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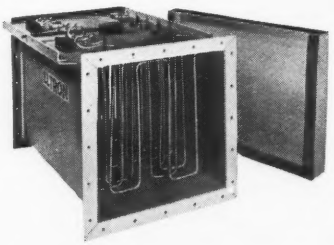

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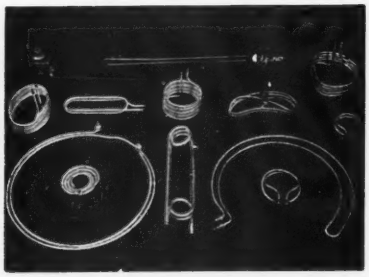

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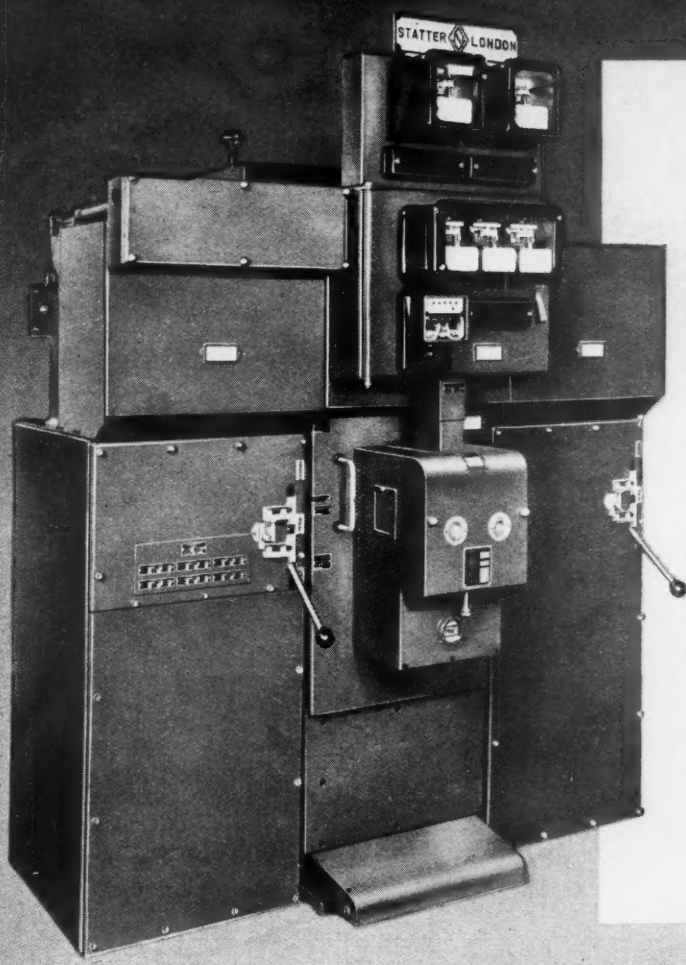

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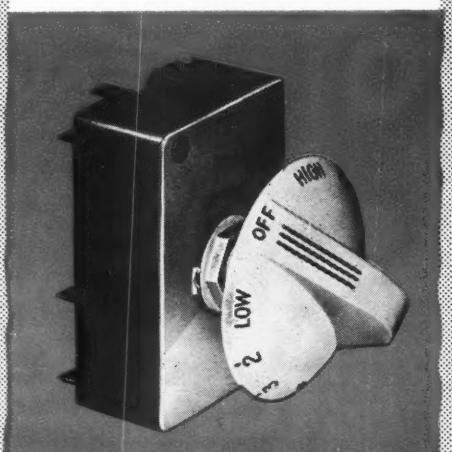

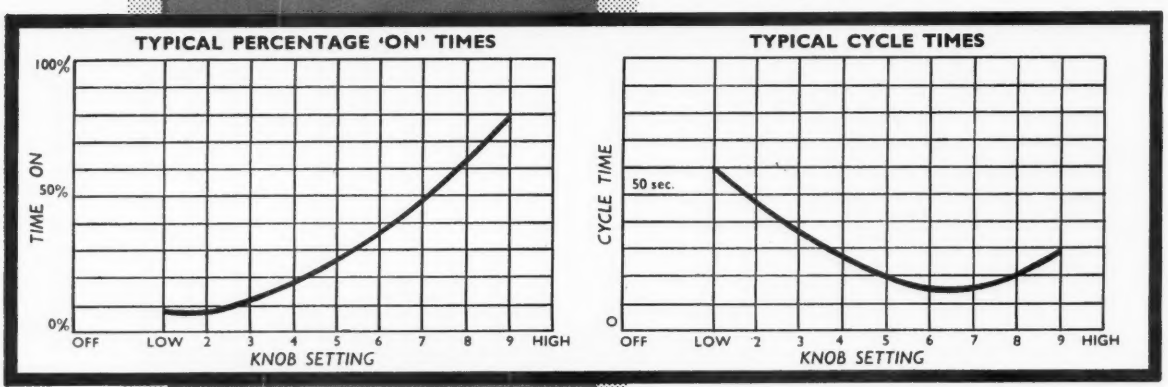

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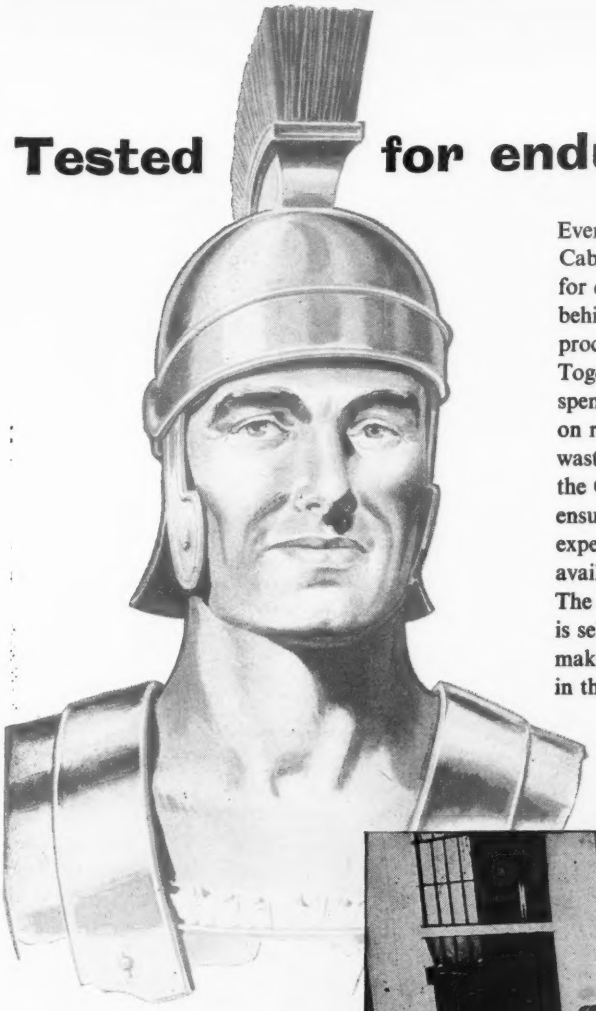

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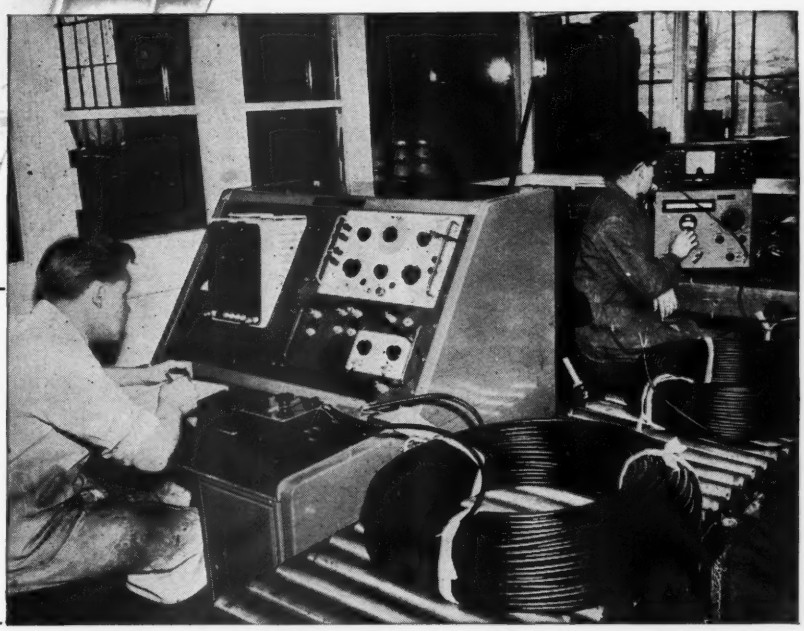

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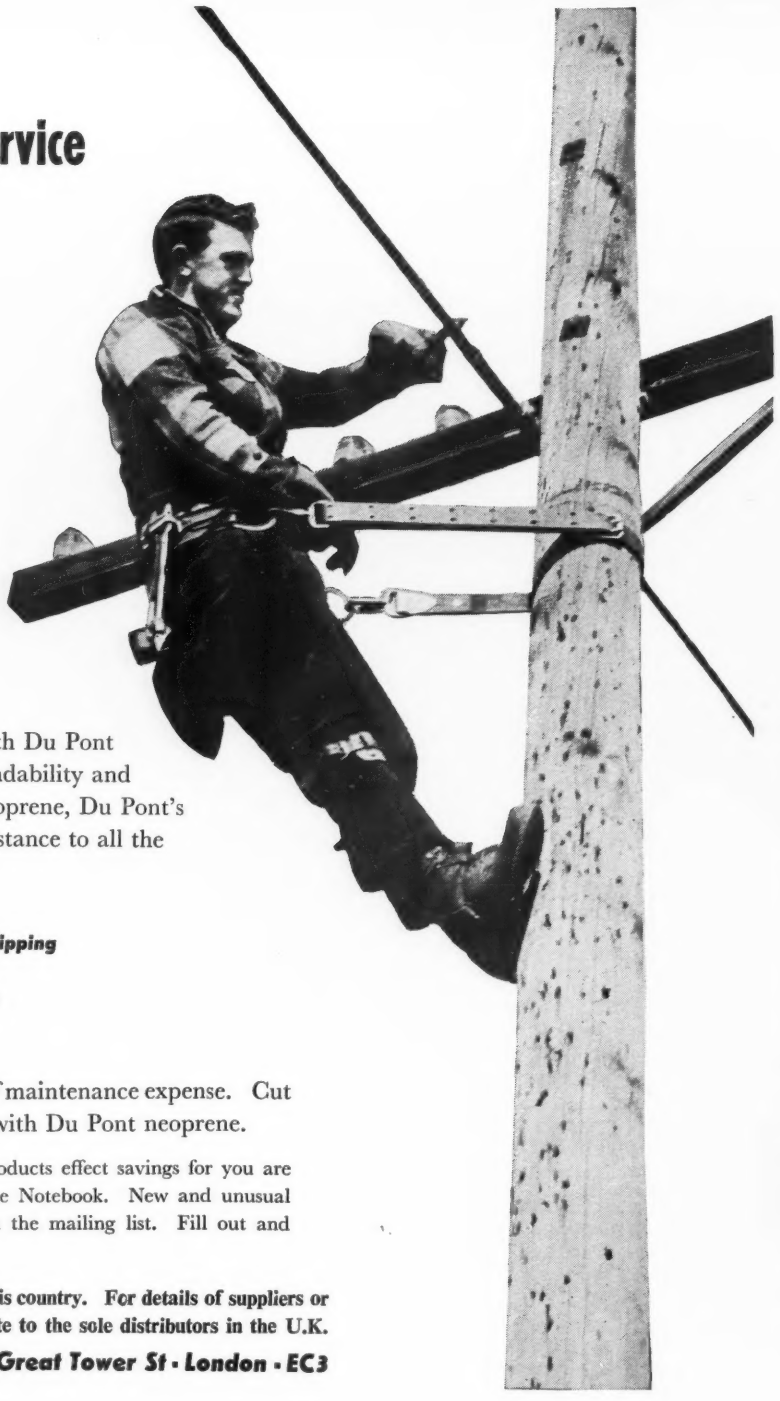

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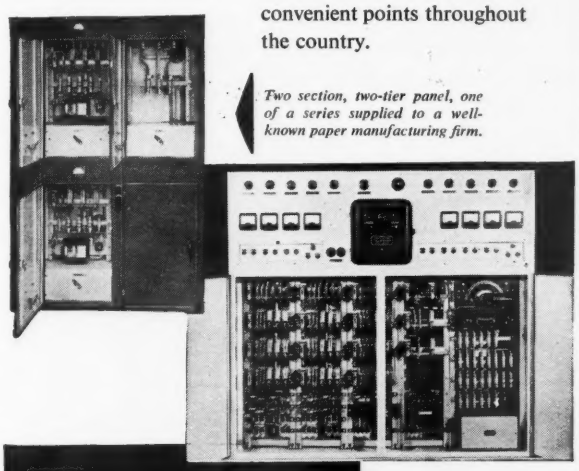

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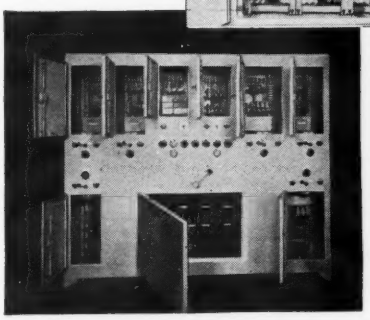

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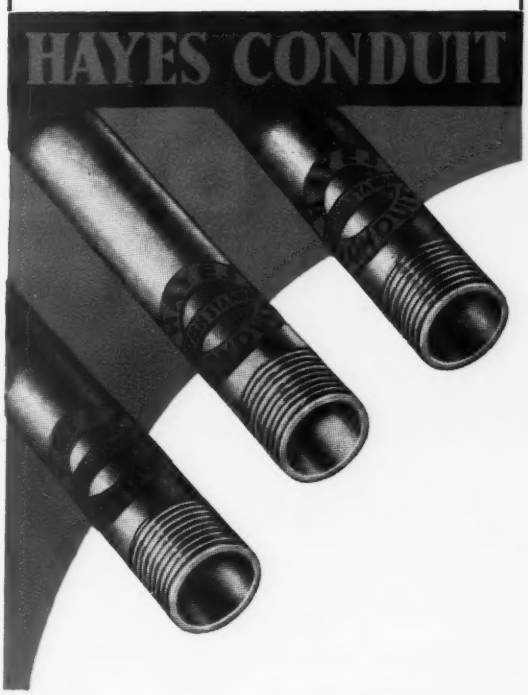

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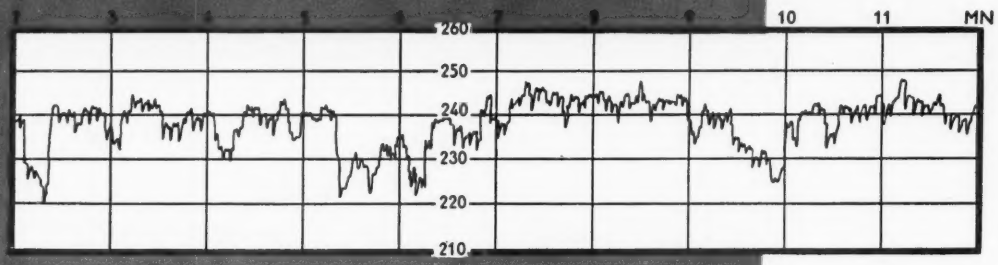

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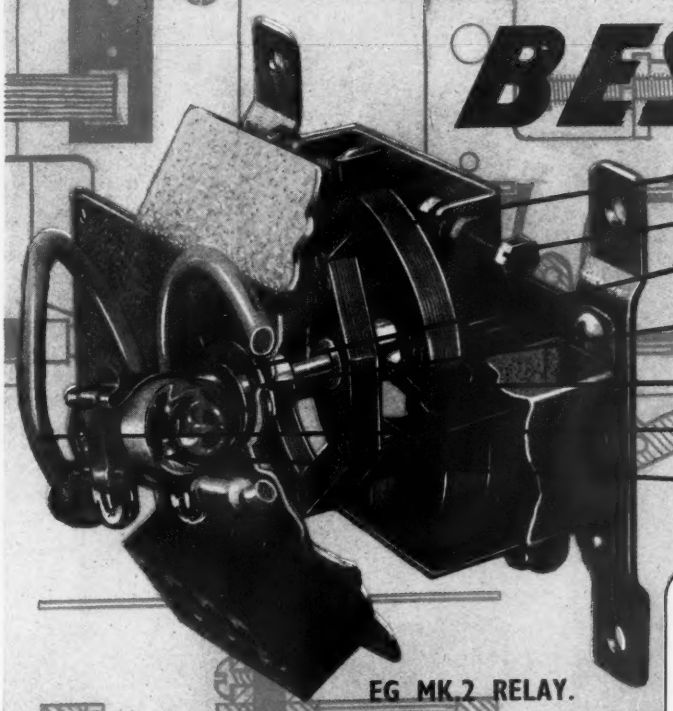

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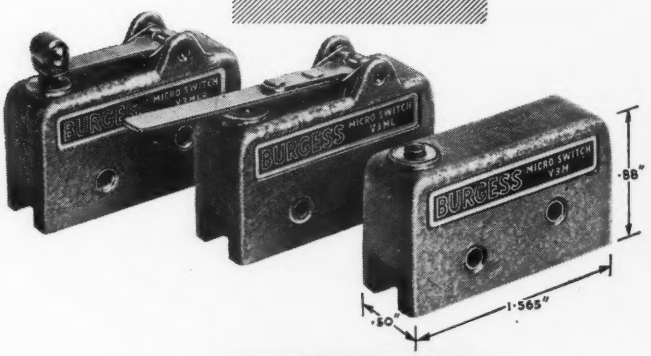

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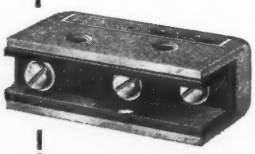

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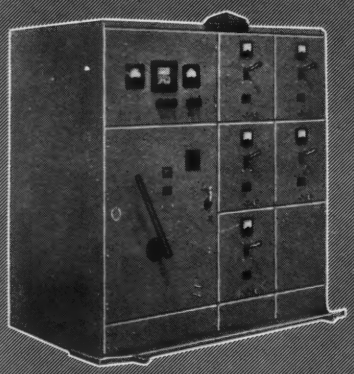

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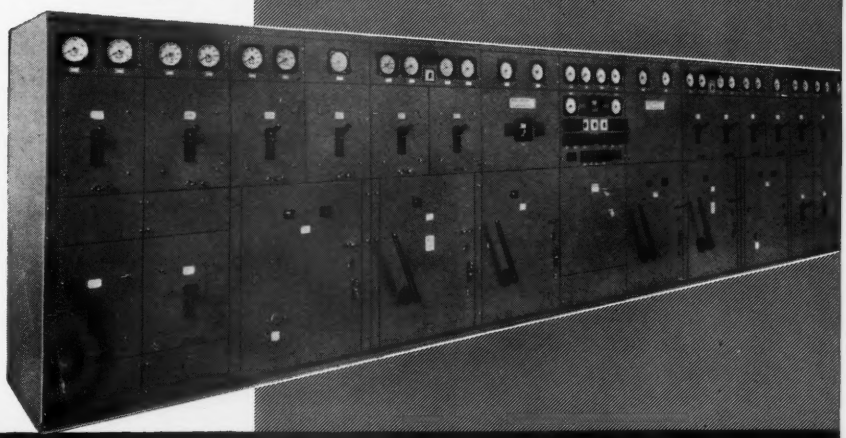

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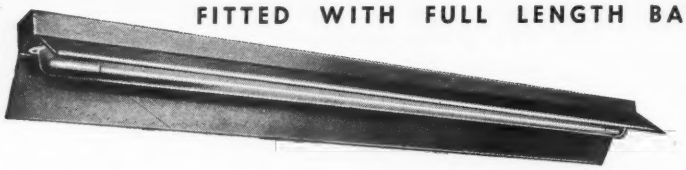

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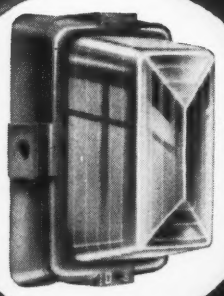
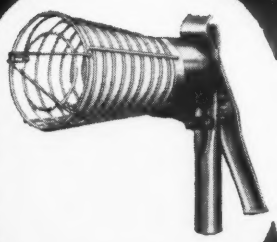

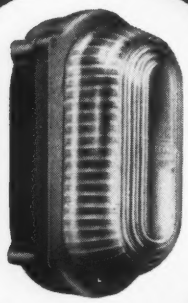
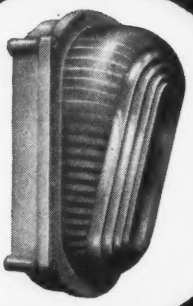
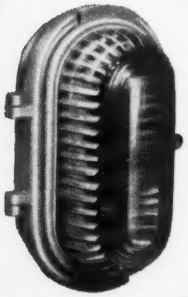
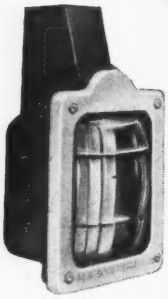
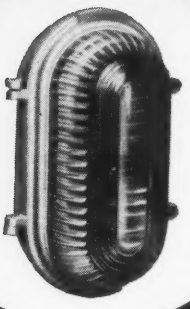
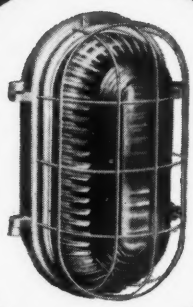
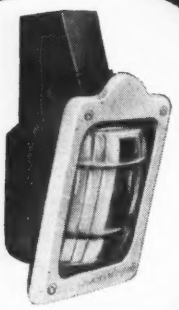
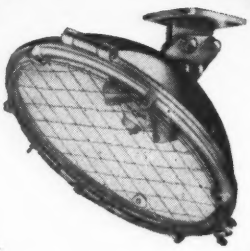
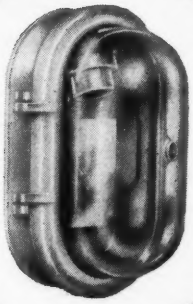

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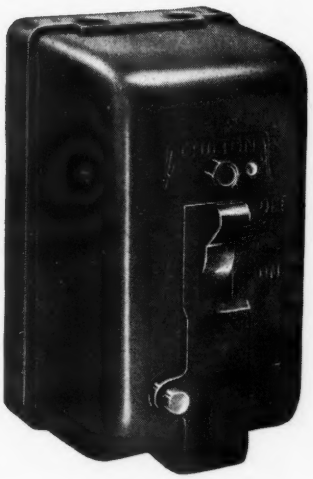

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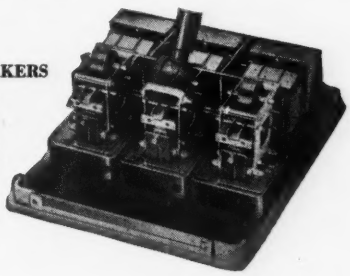

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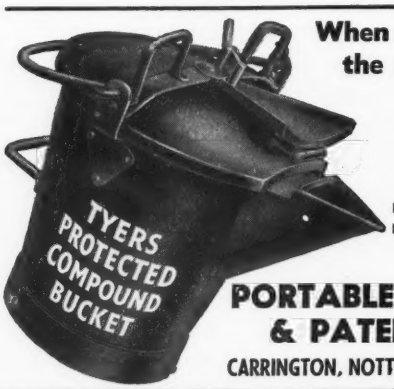

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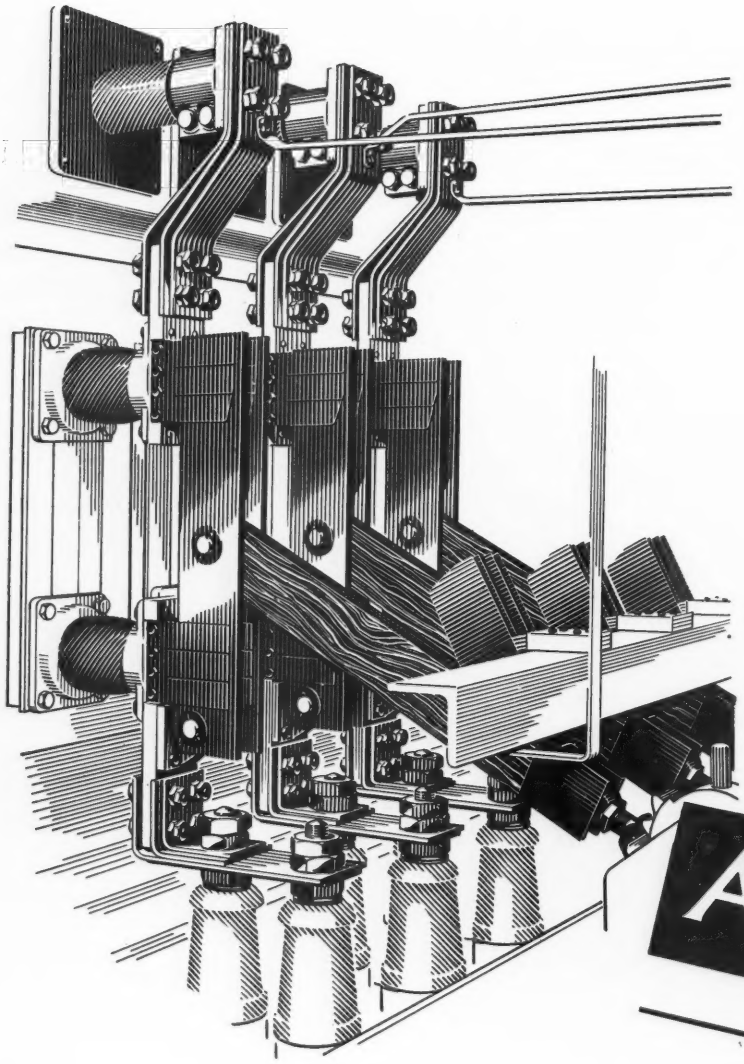

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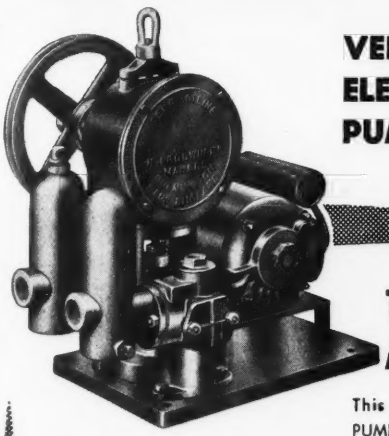

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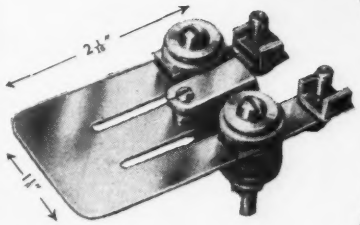

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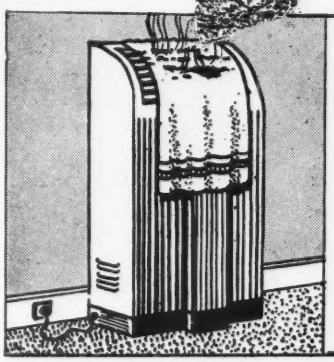

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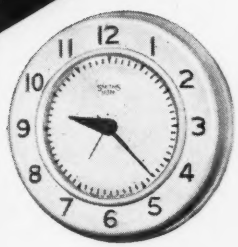

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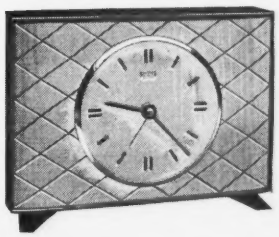

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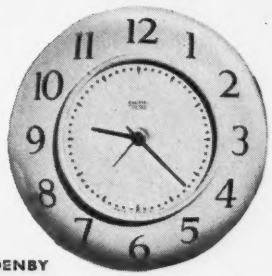

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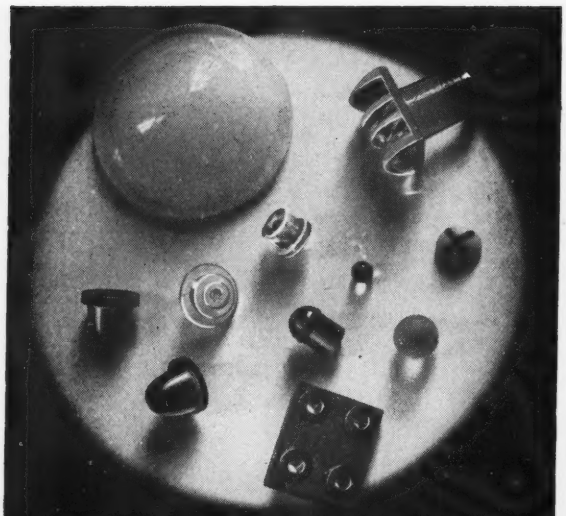

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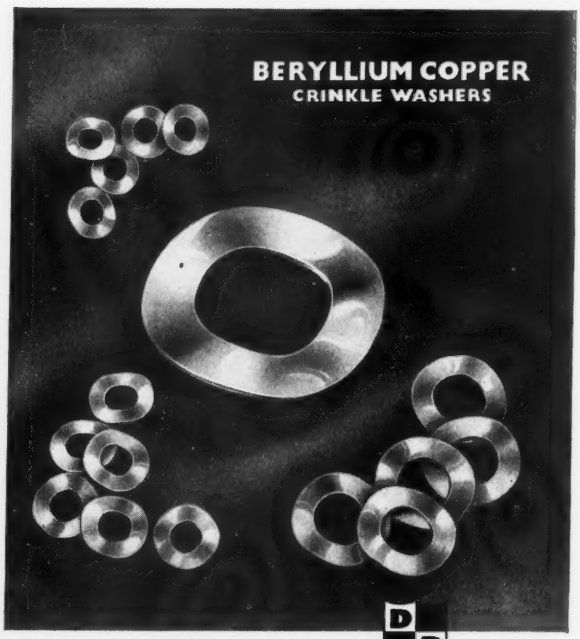

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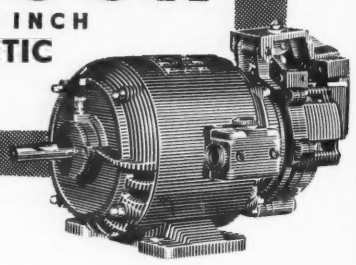

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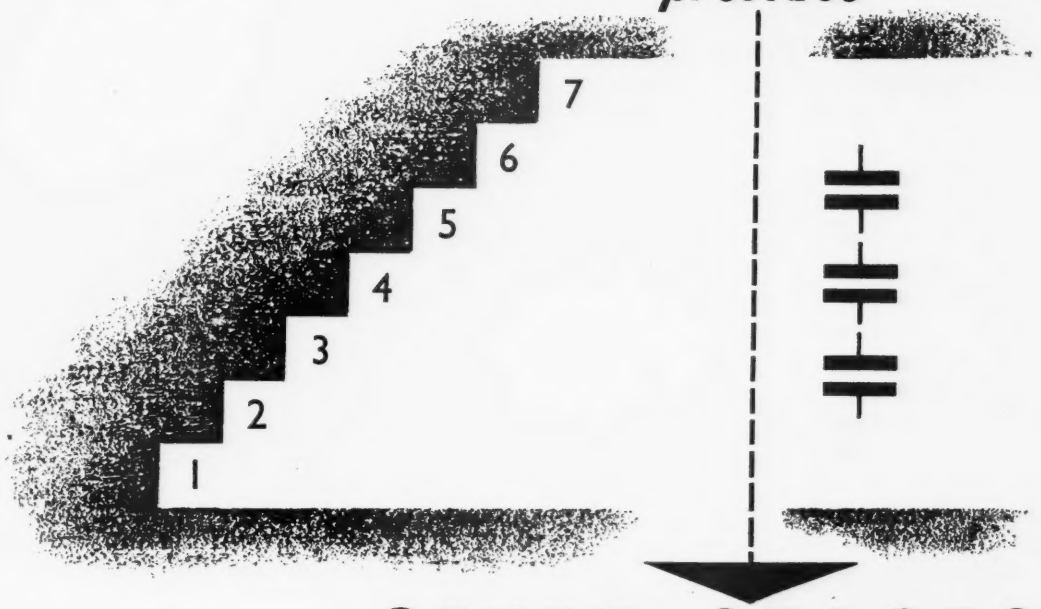

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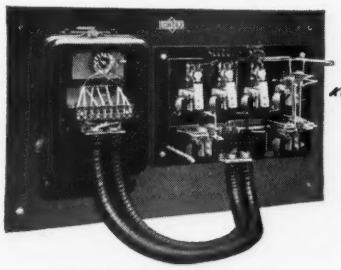
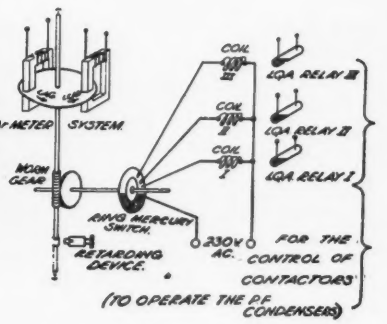


Londex Power Factor Regulator New Economy Type



Schematic diagram of Londex Power Factor Regulator for 3 stages

This new development is suitable for up to 7 stages, but requires only 3 capacitors and 3 contactors. By this method it is possible to control 7 stages of equal capacitor value, e.g., by utilizing 1 condenser of each of the following values :— 10 KVAr, 20 KVAr, 40 KVAr, a maximum of 70 KVAr is available in 7 stages of 10 KVAr each.

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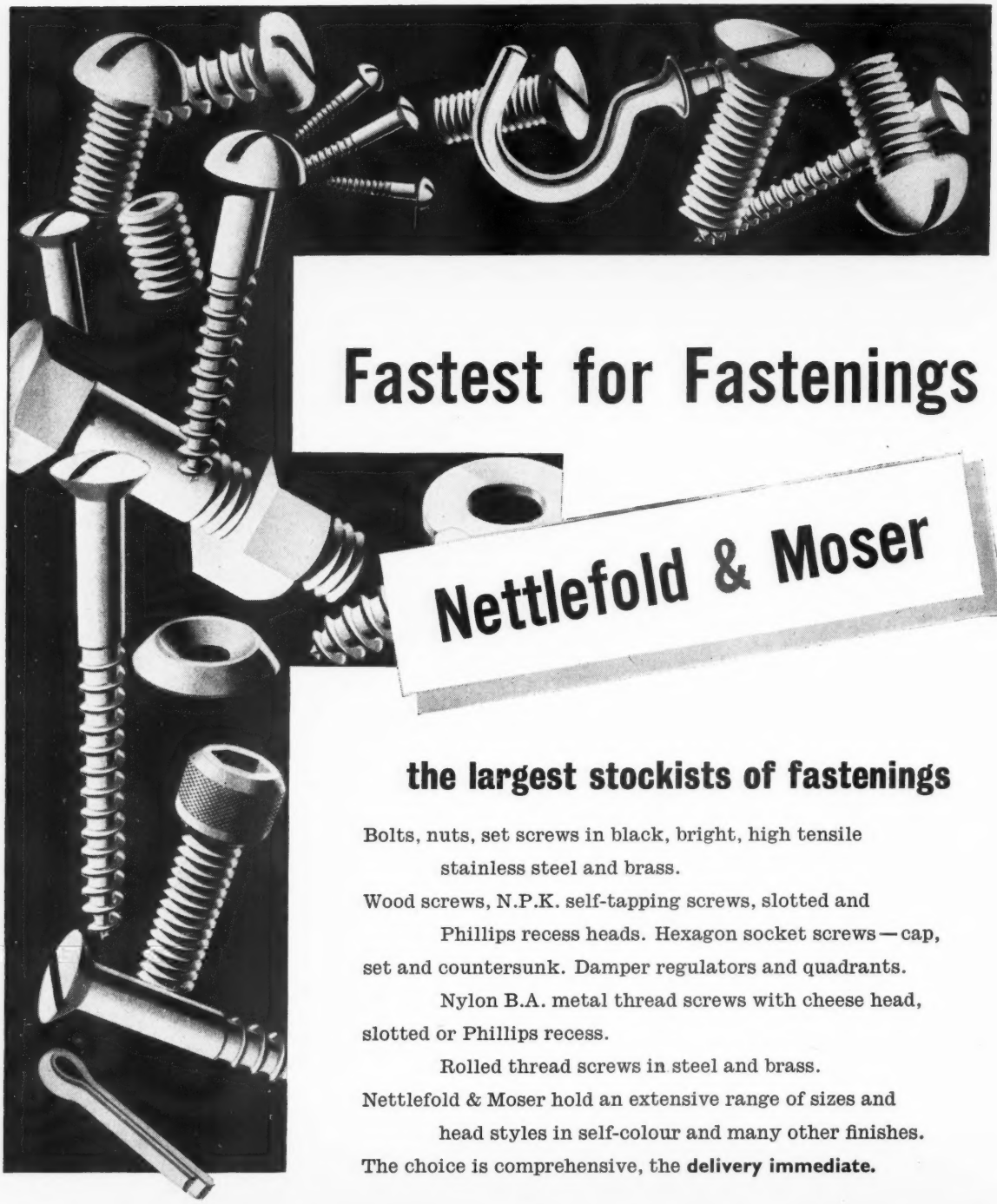

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6 SEPTEMBER
1957

ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E. *General Editor:* J. H. COSENS *Technical Editor:* P. W. TUCKER, M.I.E.E.

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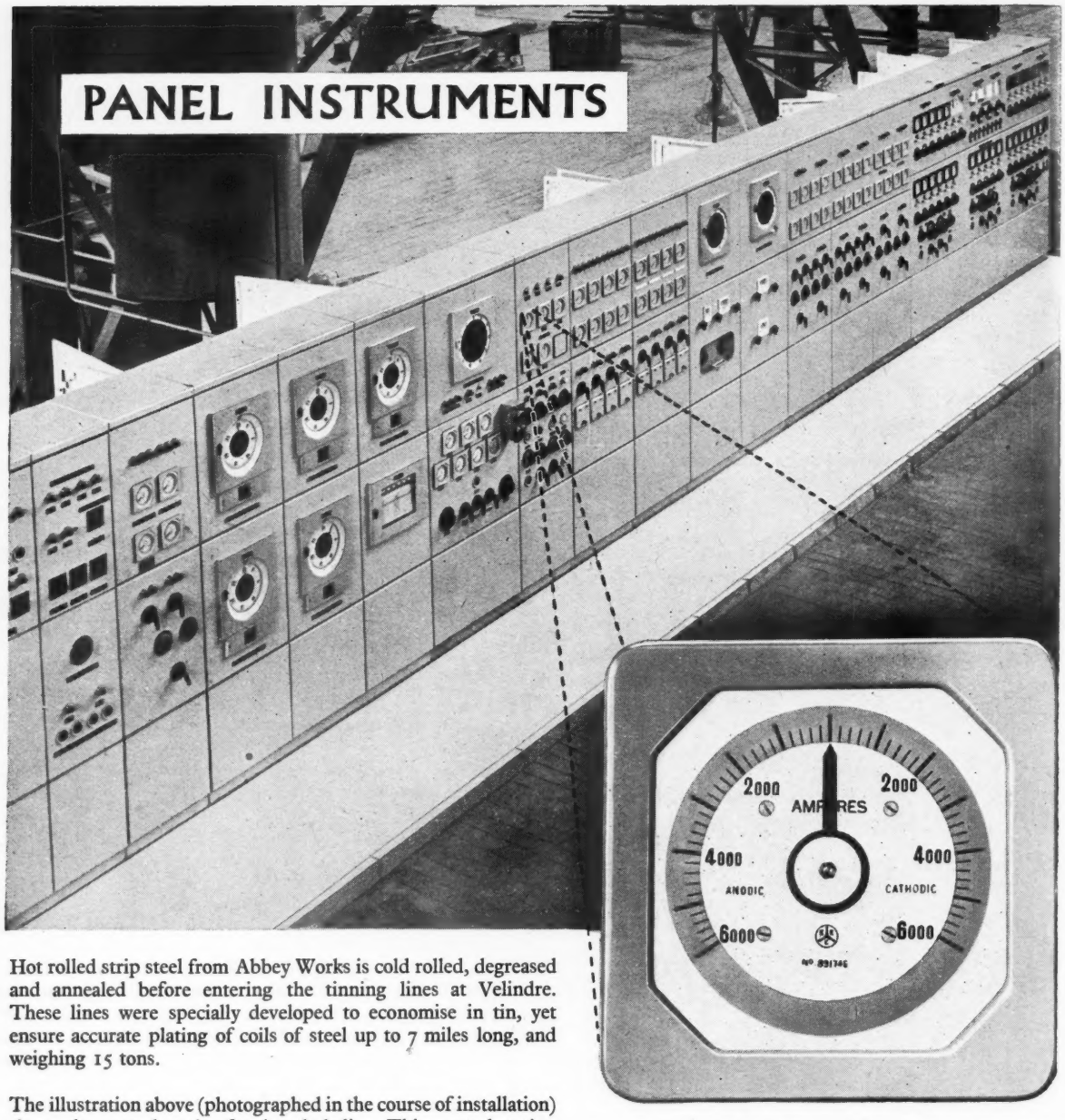

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ELECTRICAL REVIEW

6 September 1957 Vol. 161 No. 10 Established 1872

Slurry-Fired Power Stations

BECAUSE of the rapid strides which are being made in the development of electrical power from nuclear energy, many people are becoming prone to believe that nuclear power is a panacea for our fuel shortage problems. Although nuclear power will come along just in time to save this country from a serious power shortage, the coal fired power station must not be neglected since the bulk of our power will be generated in these plants for many years to come. A great deal is, in fact, being done to improve the thermal efficiency of conventional fuel fired stations, and at the same time the possibilities of using alternative fuels to coal are being investigated.

There has been continued development of mechanical mining methods in recent years to allay the shortage of coal and this has resulted in an increasing proportion of dirt and fines being brought to the surface, necessitating coal preparation plants to suit coal consumers' requirements. Although a certain amount of fines removed from the coal in the preparation plants can be sold, there is always a residual slurry which is not only unsaleable, but is difficult to dispose of. Recent estimates show that there is more than six million tons of this material in slurry ponds throughout the country and the amount continues to grow.

Most of this slurry is concentrated in Scotland and South Wales and as it has a not altogether unreasonable calorific value efforts are being made to design boiler plants to extract the heat from it. A good example of what is being done in this direction is provided by the 60 MW Barony power station of the South of Scotland Electricity Board, which is described in this issue and is successfully burning slurry with an average calorific value of 6,450 B.Th.U./lb.

There is no simple method of describing the fuel which is used in the station. When it is recovered from settling ponds at the older types of coal preparation plants, it is known as " slurry," but when separated from washing effluents by vacuum filtering in a modern plant, it is known as " filter cake." In either form it is irregular in quality and composition, extremely fine, and it has a high ash and moisture content. This combination, together with an admixture of finely divided clay, makes it very difficult to deal with.

The fuel handling plant at Barony overcomes the inherent disadvantages of the fuel and the basis of the design has been the need to keep it continuously in motion during the handling and milling processes. Until the Barony Colliery coal preparation plant and a similar plant to be constructed at Killoch Colliery are in full production,

most of the fuel for the station will come from slurry ponds within a radius of 25 miles, where the estimated total quantity is over 600,000 tons. If this plant proves successful, and there seems to be no good reason why it should not, it may well be that several such power stations will be built to assist in the conservation of our fuel supplies.

UNDERGROUND GASIFICATION

In addition to the developments in slurry-fired power stations, investigations are also proceeding into the possibility of underground gasification of coal seams as a means of generating electricity. Experimental work has been going on at Newman Spinney, Derbyshire, since 1949 and a detailed description of the techniques being adopted was published in the *Electrical Review* of 18th November, 1955. These experiments have now resulted in the announcement that a 3,750 kW pilot power station is to be built on the site by the Central Electricity Authority.

If the results are satisfactory it is likely that much larger plants will be built in the future because, although there is a chronic shortage of coal in this country, there is over 500 million tons which is economically unmineable by conventional means. All this coal is considered to be suitable for gasification and, if it were fully exploited, 1,000 MW could be generated continuously for 50 years. Thus it would seem that there is every possibility of setting up a new fuel and power industry which would have an annual turnover rising to more than £50 million and possibly release coal for export.

PROFESSIONAL ENGINEERS

In the course of last week's leading article, dealing with the new moves of the Engineers' Guild to advance the status of the professional engineer, we referred to the parallel situation in the United States. We compared the strength of the Engineers' Guild with the corporate membership of the three leading engineering institutions and quoted the *Electrical World* as saying that only a small minority of the 50,000 members of the American Institute of Electrical Engineers were affiliated to the National Society of Professional Engineers—the American equivalent of the Engineers' Guild. A correspondent in a later issue of the *Electrical World* says, however, that actually the N.S.P.E. has a membership of 42,000, which is certainly a much better proportion though still, of course, only a comparatively small part of the total number of professional engineers of all kinds in the United States.

AIRCRAFT ELECTRICAL EQUIPMENT

For many years now the exhibition of aeronautical equipment and instruments, which is held in conjunction with the flying display organised by the Society of British Aircraft Constructors, has emphasised the increasing use of electrical equipment in aircraft. As the performance of aircraft has been improved so more rigorous demands have been made on the electrical equipment and the electrical industry has had to put in a great deal of hard work to ensure that it operates at the highest possible efficiency under the extremely arduous conditions prevailing in high speed, high altitude aircraft.

With the introduction of guided missiles far greater demands are now being made upon the electrical industry to produce apparatus which will withstand conditions far more severe than anything encountered in manned aircraft. Speeds, acceleration, pressures and temperatures have increased considerably and at the same time the electrical apparatus has become like something from a Wellsian novel. The Farnborough exhibition, which is reviewed in this issue (pp. 417-20), illustrates many of the ways in which the electrical industry is attacking the problems of guided missile control and instrumentation.

EDDY-CURRENT USES

With the mounting tendency to speed up factory processes comes an equally insistent need for compact portable instruments for inspection and accurate control. An example, cited by the British Non-Ferrous Metals Research Association, provides a means of rapid identification of mixed metals or possibly of detecting invisible surface flaws. The instrument, which possesses the merit of great portability, is based on the use of eddy currents, which distinguish between various alloys by virtue of their differing electrical conductivities.

EXPORT TRADE PROGRESS

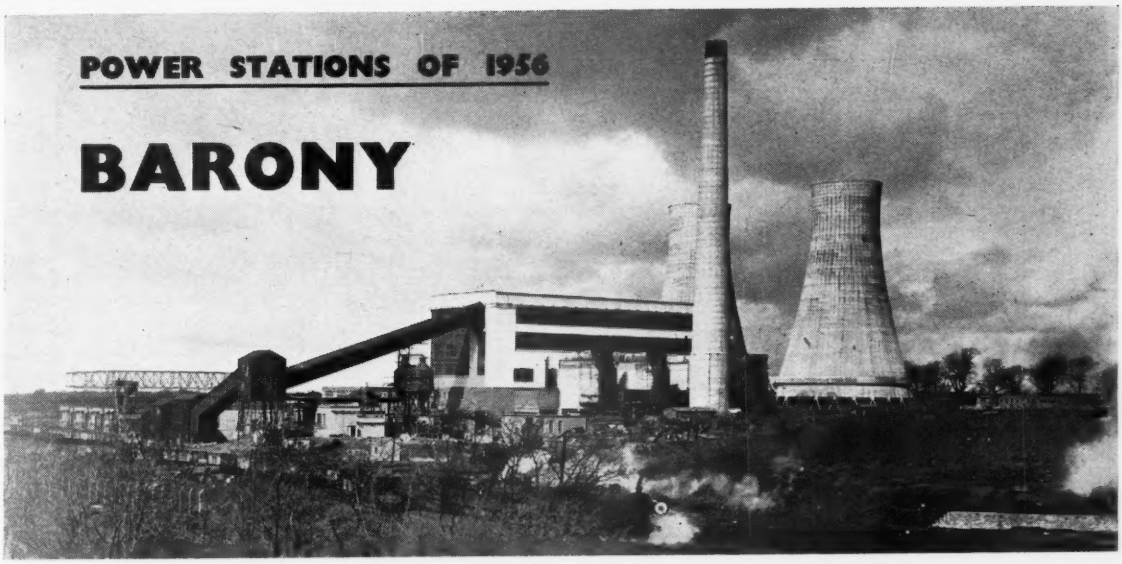
Continued advance in electrical exports from this country was recorded in July. The figures published in last week's issue showed that a new monthly record was established and that for the first seven months of this year electrical exports increased by 7 per cent.

An analysis of trends in world trade published by the *Board of Trade Journal* shows that exports of non-electrical machinery from this country rose by 9 per cent in 1956 but world exports of this class increased at twice this rate. On the other hand, the advance of 13 per cent achieved in the export of British electrical goods was only slightly below the world rate of expansion (14 per cent). It is pointed out, however, that both the United States and Germany increased their exports of both electrical and non-electrical machinery by over 20 per cent.

RAILWAYS SAVE COAL

Writing in the *Electrical Review* about three years ago, Mr. C. M. Cock estimated that by general electrification British Railways could reduce their annual coal consumption from 14 million tons of the best quality to 5½ million tons of the inferior coal used in power stations. The Eastern Region of British Railways claims that by the conversion of its services to diesel and electrical operation it is saving coal at the rate of 250,000 tons a year and it hopes to achieve a saving of a million tons a year by 1961.

It would be interesting to know how much of this economy results from electrical and how much from diesel operation. " Dieselisation " certainly saves coal but at the same time it requires imported oil. The saving brought about by electrification is a more realistic one for the national economy.



SCOTTISH 60 MW PLANT DESIGNED TO BURN SLURRY

THE extending use of mechanical mining, necessary though it is to increase coal production, has resulted in a high proportion of dirt and fines being brought to the surface, necessitating coal preparation plant to suit market requirements of coal. While a certain proportion of the fines removed by coal preparation plant can be marketed, there is always a residual slurry which is not only unsaleable, but is actually difficult to dispose of. According to recent estimates there is over six million tons in slurry ponds throughout the country (mainly concentrated in Scotland and South Wales) and this amount is still growing.

Many confident statements have been made concerning the ability to burn slurry, but most of them are only justifiable for a particular definition of "slurry," which may vary from one district to another. East Midlands slurry, for example, might more correctly be called "fines"; it is a grade of coal which varies in size from $\frac{1}{8}$in to 0, and as such, presents no insuperable difficulty in handling or burning.

In the present article we are concerned with the type of washery slurry which is grabbed from slurry ponds after settling from the wash water and, as it contains up to 40 per cent of moisture, has hitherto been regarded as completely worthless. This slurry, which is frequently encountered in the form of a paste with the consistency of putty, has hitherto presented greater problems in the handling rather than in the combustion. It is generally recognised that the secret of handling it successfully is to keep it continuously on the move. Between recognising this principle and

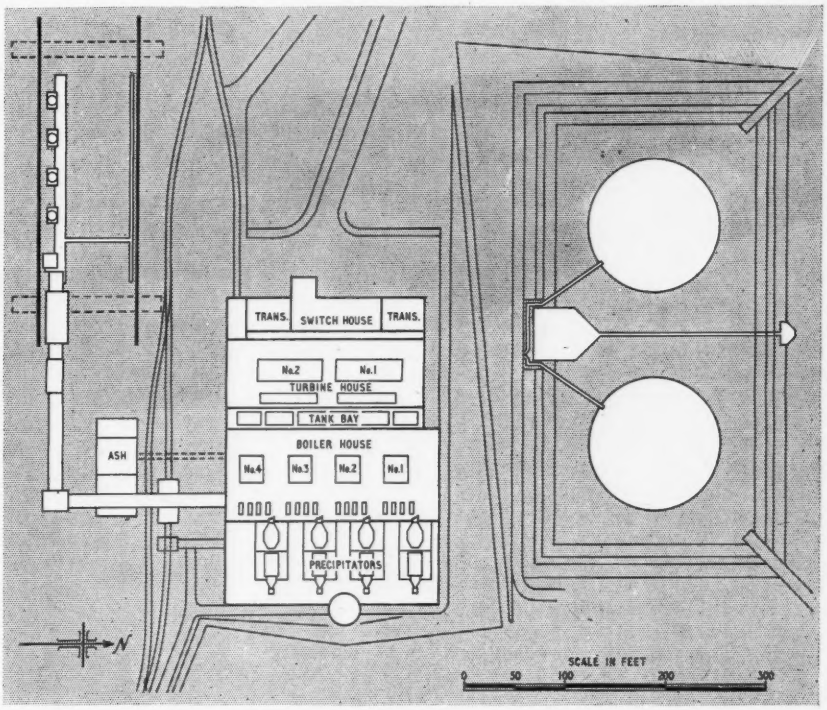


Fig. 1.—Site plan of Barony power station

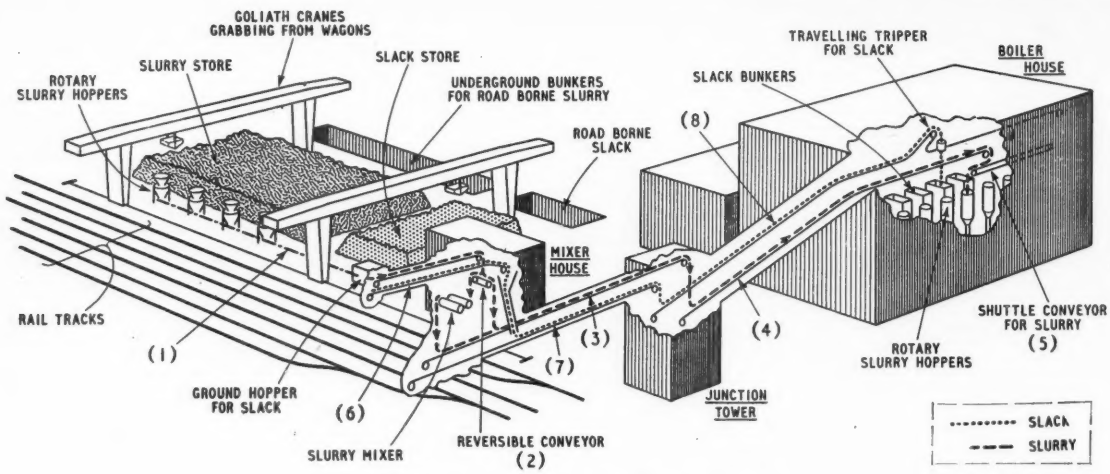


Fig. 2.—Schematic arrangement of the slurry handling plant

translating it into practice there is a very wide gap, since it is necessary to devise special techniques. Babcock & Wilcox, Ltd., have worked on the problems involved in this continuous handling without the use of bunkers or chutes of normal design, which are useless for handling material with the characteristics of slurry. As a result plant has been developed and installed in the Barony power station of the South of Scotland Electricity Board. This generating station comprises an initial installation of two 30 MW turbo-alternators and four 150,000 lb/hr boilers fired by slurry, either with or without an admixture of slack coal, which can also be used by itself to carry the load as a temporary measure.

Character of Site

In determining the general location of the site of the power station, the dominant factor was its proximity to the large modern coal preparation plants now being constructed by the National Coal Board at Barony and Killoch Collieries, Ayrshire, as part of its development programme. It is the slurry from these preparation plants which Barony power station is designed to burn. The installed capacity of 60 MW is small by modern standards but this was determined originally by the amount of fuel which will be available from the surrounding colliery groups.

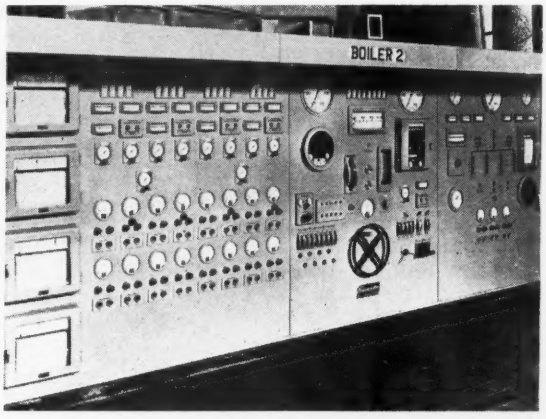
Because of the proximity of the station to Barony Colliery regard had to be paid to the necessity to protect the plant and buildings from the effects of subsidence which may occur on the surface when coal is mined. The shaft and surface buildings at the colliery are protected by leaving the coal unworked within a predetermined radial distance from the colliery shaft. It was necessary to ensure that the station site was similarly protected by leaving an unworked pillar of coal, or " pillar of support " as it is commonly known. During the site investigation it was established that adequate protection could be obtained by extending the existing colliery pillar of support on one side only, thus minimising the amount of coal which had to be left.

Under the top soil the strata consists of alternating layers of boulders and boulder clay to a depth of about 89ft at which depth sandstone is found. About 100,000 cu yd of earth was excavated while preparing the site for foundations and this was used to form the rail siding embankments. The main foundations are of reinforced concrete designed to give loadings within the 2·5 ton/sq ft bearing capacity of the ground. The buildings are of conventional steel-framed construction clad with facing bricks to above operating floor level. Thereafter, corrugated asbestos sheeting is used with glazing, while the roof is of light aluminium decking covered by several layers of insulation boarding, felt and bitumen.

As shown in Fig. 1 the two 30 MW turbo-alternators and four pulverised fuel-fired boiler units are housed within the main building which is roughly 216ft square and 100ft high to the top of the boiler house roof. To the north of this are situated two 200ft high cooling towers, while to the south and south-west respectively, are the ash and fuel handling plants. To the rear and east of the boiler house, electrostatic precipitators operating in conjunction with mechanical type dust collectors are connected to the flue duct outlet of each boiler unit and the single 265ft high reinforced concrete chimney.

The general arrangement of the fuel handling plant is shown in Fig. 2 from which it will be seen that the slurry arrives at rail tracks alongside the station. Since its consistency does not permit of tippling it is grabbed out of the wagons by Goliath cranes of 4 tons capacity and transferred to the main storage area which, with a maximum depth of 20ft at the centre, has a capacity of over 4,000 tons. Slack is handled by the same methods, there being storage space for about 550 tons.

The heart of the fuel handling scheme is a recently



No. 2 boiler control panel

developed rotary hopper which enables the slurry to be fed on to a belt conveyor in the same manner as graded coal is fed from an ordinary bunker with a vibratory feeder. The hopper has sloping sides with a reverse batter and the base takes the form of a motor-driven rotating table. There is a fixed skirt carrying a plough which, as the table rotates, continuously cuts off the slurry in slices which fall on to a belt conveyor. The main design feature of the hopper, however, is that the body itself is mounted on heavy roller tracks and is free to rotate. This avoids the continuous shearing action which would otherwise take place between the sticky slurry and the hopper sides, and which would not only require very high motor power, but might easily result in the hopper becoming jammed with a mass of stationary material skidding on the rotary table instead of revolving against the plough.

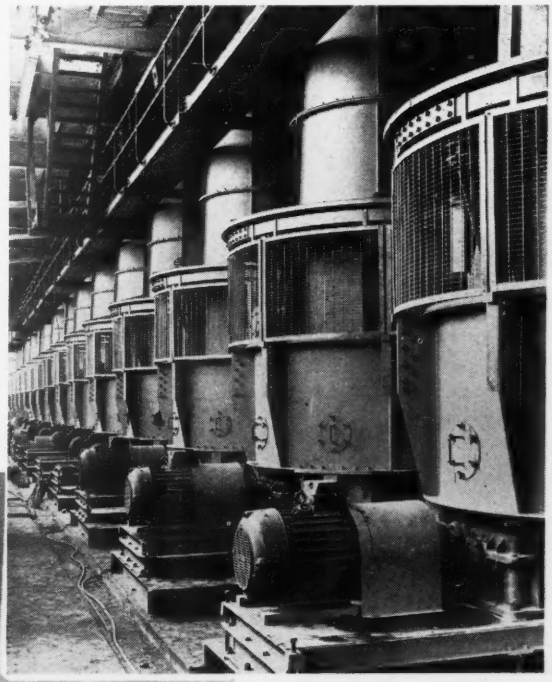
From the rotary hoppers the slurry is conveyed by belt conveyor No. 1 to the mixer house (see Fig. 2); this, while not essential to the scheme, is a worthwhile refinement since it enables different grades of slurry to be fed from different rotary hoppers in any desired proportions and intermittently mixed before being passed to the boiler house. Slurry enters the top of the mixer house, under overband magnetic separators to remove tramp iron, and is delivered overband from No. 1 conveyor to No. 2, a short reversible belt conveyor which delivers it to screw-type paddle mixers which, in turn, deliver it to No. 3 belt conveyor.

When mixing is not required, No. 2 belt conveyor is reversed so that the slurry is delivered overband direct to conveyor No. 3. This arrangement corresponds to the by-pass chutes and flap valves which will be used with normal coal, but would be completely useless with slurry. No. 3 conveyor rises to a junction tower where a right-angle bend is made to approach the boiler house. Here, the slurry is delivered overband to No. 4 conveyor, down the straight chute which is arranged with electrical vibration to eliminate all possibility of a hang-up. The slurry is transferred by No. 4 conveyor to the boiler house where it is transferred overband to a reversible shuttle conveyor (No. 5) which, being movable longitudinally, can deliver the slurry to any one of the hoppers. These are also of the rotary pattern, but are smaller editions of the main hoppers at the coal store. From these, the slurry is fed into the pulverising mills.

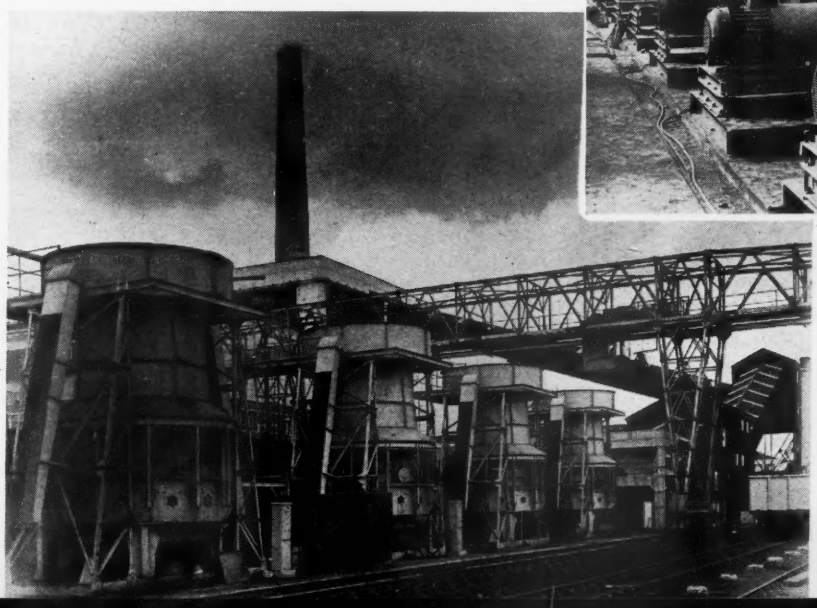
The slack coal feeding arrangements follow orthodox practice throughout. It is grabbed from the storage area, deposited in a ground hopper of conventional design and fed by a vibratory feeder to conveyor No. 6 which runs parallel to No. 1. In the mixer house it passes under overband separators to remove tramp iron and delivers to No. 7, paralleling slurry conveyor No. 3. At the junction tower it transfers at right-angles to conveyor No. 8, paralleling slurry conveyor No. 4. At the boiler house it is distributed by means of a travelling tripper to the slack bunkers from which it is released to the mills when a mixture of slack and slurry is to be fired. Unlike the slurry plant, which runs continuously, the hoppers provide only buffer storage to absorb fluctuations in mill loading; the slack conveying plant can be shut down when the bunkers are filled.

Pulverising Mills

Four Krammer type pulverised fuel mills supplied by Deutsch Babcock & Wilcox A.G. are provided for each boiler. These are fed by means of chutes from the rotary bunkers or slack coal bunkers. A hot gas-air mixture up to 1,180 deg F can be introduced into the mills to dry the fuel during milling. The pulverised fuel is exhausted from the mills by fan in the usual manner and discharged to the boiler burners. An automatically controlled damper system adjusts the temperature of the hot gas-air mixture entering the mills to that required to reduce the moisture content to one per cent. Ventilating louvres are provided in the boiler house building to give an adequate supply of air around the boiler and to the forced draught fan inlet without creating draughts. Each pul-



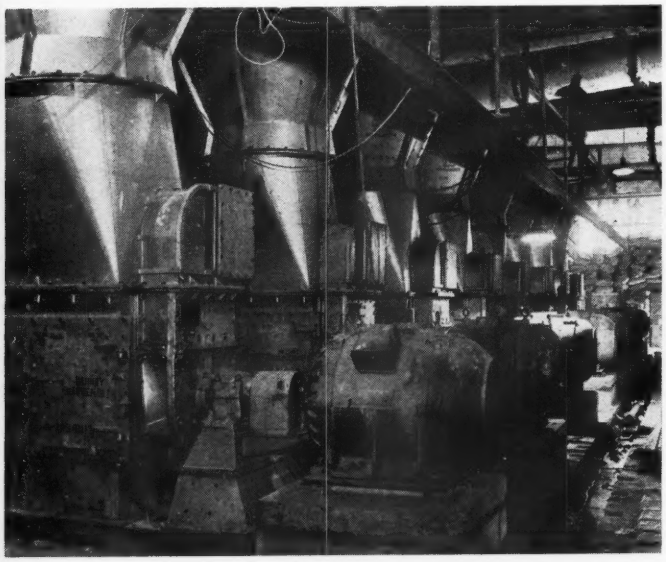
Above: Rotary hoppers feeding slurry to the p.f. mills



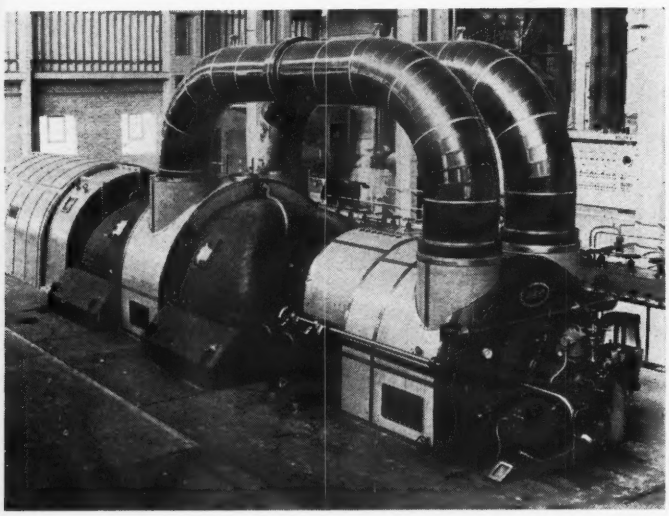
Left: These rotary hoppers enable the slurry to be fed on to a belt conveyor in the same manner as graded coal is fed from an ordinary bunker with a vibratory feeder

verised fuel mill is driven by a 135 b.h.p. 975 r.p.m. G.E.C. induction motor, while the Sturtevant exhauster fans are driven by 55 b.h.p. 1,460 r.p.m. induction motors of the same make.

The ash content of slurry is about 35 per cent and the ash plant installed by Babcock & Wilcox, Ltd., is designed to handle 400 tons of ash and dust in eight hours. This represents about three times the normal amount of ash in a conventional station of similar size. The plant is sub-divided into three distinct sections to deal with ash, coarse grits and flue dust respectively. Each boiler is equipped with a water-filled ash hopper from which the larger particles of ash and clinker are removed by high-pressure water jets and sluiced to the ash settling ponds outside the boiler house. After a period of settlement, during which the water is drained off through louvred screens, the ash is grabbed from the pit by an overhead travelling crane and deposited in side-tipping rail wagons.



Four Krammer type p.f. mills are provided for each boiler



The completed station will accommodate two such 30 MW G.E.C. turbo-alternators

Dust and coarse grits are extracted from the flue gas by a multi-vortex dust collector and stored in mild steel hoppers, from which they are removed by screw type mixer conveyors. The material is then discharged into rail wagons by a conventional belt conveyor. The dust collected in the Sturtevant electrostatic precipitators, air heaters and economiser hoppers is removed by vacuum and passed dry to the dust cyclone separators which deposit it in an overhead storage bunker outside the boiler house. The whole of the ash is removed by rail from the station and deposited by the National Coal Board along with the waste from Barony Colliery.

The completed station will accommodate four Babcock & Wilcox boilers of the two-drum high-head type, each with a total heating surface of 10,900 sq ft. Each has a maximum continuous evaporative capacity of 150,000 lb/hr, the pressure and temperature of the steam at the superheater outlet being 625 lb/sq in and 865 deg F with a final feedwater temperature of 356 deg F. The guaranteed gross efficiency of the boiler is 79·5 per cent when operating with a final feed temperature of 356 deg F and fuel with an average calorific value of 6,450 B.Th.U/lb; the boiler is designed to operate satisfactorily with a fuel c.v. ranging between the limits 5,500 to 8,000 B.Th.U/lb.

The radiant type of furnace has eight pulverised fuel burners firing horizontally through the front wall, while eight retractable oil burners equipped with automatic spark ignition are provided for lighting-up purposes. The steam temperature is controlled by an attemperator which is guaranteed to maintain the designed superheat temperature within ± 15 deg F at all loads between 120,000 lb/hr and 150,000 lb/hr. An unusual feature of the boiler is the very large air preheater. This has a total surface of 47,000 sq ft and is arranged in two sections to provide hot air for combustion and for fuel drying in the p.f. mills.

The design of the economiser and air heaters has been adjusted so that the heat loss at the boiler exit is not excessive when slack coal or a mixture of slack and slurry is being burnt. The boiler efficiency is thus improved when burning the mixture at the expense of some loss of efficiency when burning slurry, which requires a considerable quantity of hot air for drying. All four boilers are interconnected through two steam receivers so that any individual boiler can run with either of the two turbo-alternator sets.

The draught plant for each boiler comprises one Howden i.d. fan equipped with vane control and driven at 975 r.p.m. by a 173 h.p. G.E.C. induction motor, and one Howden vane controlled f.d. fan driven at the same speed by a 104 h.p. G.E.C. induction motor. A single Sturtevant electrostatic precipitator preceded by a Howden " Centicell " multi-vortex dust collector are provided for each boiler. The guaranteed efficiency of the combined plant at maximum continuous rating and when soot blowing is 98·5 per cent. The soot-blowing equipment comprises two mass-element blowers for the boiler, together with two rack blowers and two mass-element blowers for the superheater.

An Electroflo automatic system of boiler control is installed and this has two main functions. The first is to provide combustion control throughout a wide range of boiler loads and with varying types of fuel, while the second is to ensure optimum conditions in the milling circuit, particularly when slurry and fuel with a high moisture content is being burnt.

Considering first the combustion control, the pressure in the combustion chamber is measured and maintained

at the required value by variation of the positions of the i.d. fan outlet vanes through a heavy duty high-sensitivity regulator. This control of furnace pressure to within ±0·03in w.g. is necessary for the control of the air flow to the burners at the optimum efficiency level. The flow of combustion air is measured by means of a venturi section in the f.d. fan suction duct and controlled by varying the position of the f.d. fan outlet vanes through a regulator which continuously balances the venturi differential against an air loading pressure derived from one of three sources. The source of loading to be used may be selected on the boiler panel and a simple change-over valve allows control of combustion air either by hand setting (manual loader) or in direct ratio to steam flow (steam flow/air flow correction) or in such a manner that the oxygen content of the waste gases is automatically maintained at any desired level (oxygen correction).

The control of the milling system incorporates a total of five regulators per mill to provide a controlled volume of sweeping (or drying) air or air/gas mixture at a temperature such that the final p.f./air mixture at the mill outlet is maintained constant at 210 deg F. The sweeping air volume is measured by an orifice plate in the pipe between the mill and exhauster and a damper on the inlet to the mill maintains the required flow as set on the boiler panel. Continuous adjustment of the mill inlet temperature is made to produce a final outlet temperature (p.f. and air) at a level set by the control point of a model 196 Electroflo potentiometer. Hot and cold tempering air dampers are adjusted sequentially by the potentiometer impulse to maintain a steady outlet temperature of 210 deg F and to assist in this electrical limits on the cold air damper regulator determine whether the mill is fed with hot waste gases at a temperature in excess of 1,000 deg F or with hot air from the wind box via the plenum pressure controller. The former is necessary when burning slurry or fuel with a high moisture content, while the latter arrangement (hot gas damper shut) provides a lower mill inlet temperature under starting-up conditions when burning dry fuel.

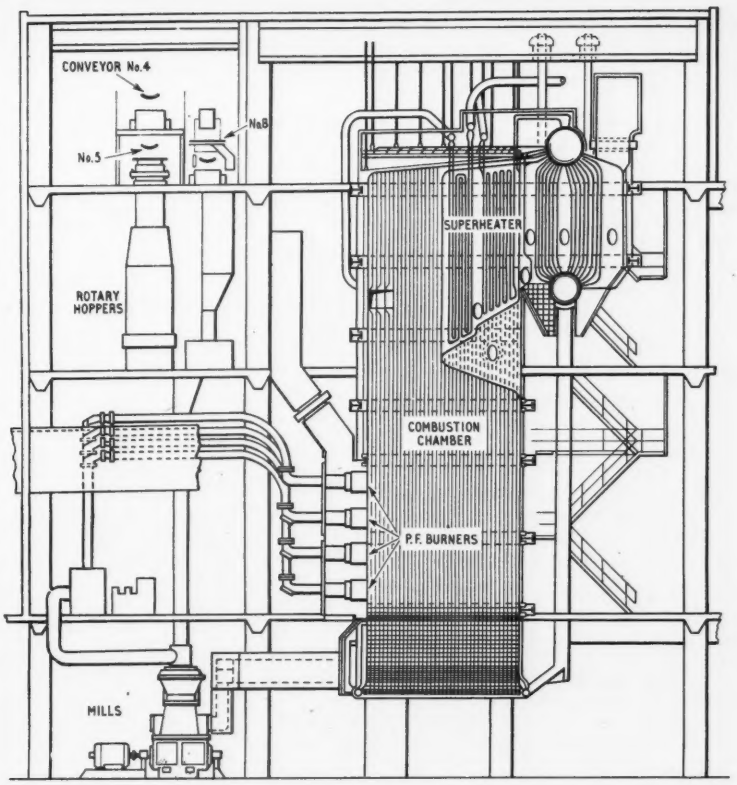
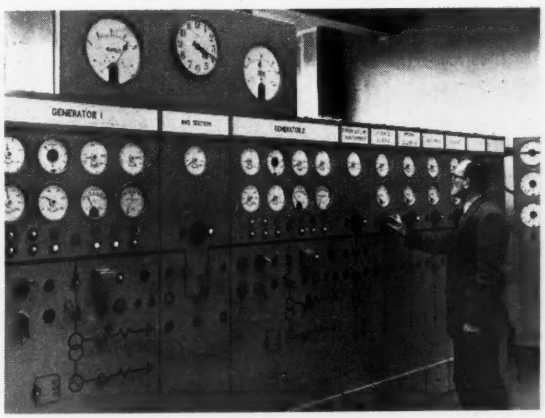


Fig. 3.—Part section through the boiler house showing slurry conveyor No. 4, shuttle conveyor No. 5, and slack conveyor No. 8

With the exception of the mill outlet potentiometer all equipment is air-operated by power cylinders of three inch or five inch bore supplied with air at 30-40 lb/sq in. All dampers can be hand operated at the regulators themselves through a by-pass arrangement and an immediate change from manual to automatic operation, or vice versa, can be made on any unit from the panel in a few seconds. Remote setting of control valves can be carried out from the panel and the positions of these valves are shown on setting indicators on the panel face. Adequate alarm devices are employed to indicate deviations from normal running, and air locks are provided on all power cylinders so that in the event of an air failure all dampers are positively locked in the position assumed immediately prior to the failure.



Part of the main control room

Generating Plant

The two 3,000 r.p.m. G.E.C. turbo-alternators are of conventional design and operate with steam conditions at the stop valve of 600 lb/sq in at 850 deg F and a vacuum of 28·7in Hg when the c.w. temperature is 70 deg F. Each machine exhausts into twin Hick Hargreaves condensers and four stages of bled steam feed heating are provided to give a final feed temperature of 356 deg F at m.c.r. Three main 675 h.p. motor-driven circulating water pumps are provided, each capable of delivering 25,000 gal/min from the main condensers to the cooling towers. The normal cooling range of the

towers is 11·5 deg F at all atmospheric wet bulb temperatures between 40 and 60 deg F and all relative humidities between 50 and 100 per cent; both towers are fitted with spray eliminators and de-icing equipment. The c.w. make-up is pumped from the River Lugar through a pipeline one mile long against a total head of 250ft. To ensure adequate supplies of cooling water during periods of low flow in the River Lugar, a reservoir with a capacity of 6,000,000 gal is provided at the base of the cooling towers.

Each alternator is connected to metalclad 33 kV switchgear through a 37·5 MVA 11·8/33 kV step-up transformer. The generator transformers and the main switchgear are situated in the annexe building adjoining the west wall of the turbine house. Accommodation has been provided in the 33 kV switch-house for a total of 17 circuits, of which 12 will be used as feeder switches to connect the station with the local 33 kV network and the 132/33 kV grid substation at Coylton. The switchboard is a single busbar type divided into two sections interconnected by a bus-section switch.

The station auxiliary transformers comprise two 10 MVA 33/3·3 kV and seven 3·3 kV/415 V transformers of various ratings placed at the main load centres. Separate auxiliary switchrooms are provided for the 3·3 kV auxiliary switchgear, electrical interconnection on a ring main being arranged to ensure continuity of supply in the event of breakdown. The electrical control room is also situated in the west annexe building overlooking the turbine and boiler house operating floors.

Acknowledgment is due to Mr. J. Henderson, chief engineer, South of Scotland Electricity Board, for permission to publish this article and to Mr. J. A. Croucher, senior generation engineer (construction), for invaluable assistance in the preparation of the material.

The principal contractors for the station are:—Foundations and buildings, John Laing & Son, Ltd.; reinforced concrete chimneys, Tileman & Co., Ltd.; cooling towers, Bierrum & Partners, Ltd.; h.p. and l.p. pipework, boilers, coal and ash plant, Babcock & Wilcox, Ltd.; turbo-alternators, General Electric Co., Ltd.; main switchgear, Cooke & Ferguson, Ltd.; auxiliary switchgear, English Electric Co., Ltd.; and cables, Scottish Cables, Ltd.

What is "Operational" Land?

FROM A LEGAL CORRESPONDENT

THE case of R. v. Minister of Fuel and Power *ex parte* Warwickshire County Council is of as much interest to electricity undertakers as to the Gas Boards because the definition of "operational" land affects all statutory undertakers. In the case in question land which was held by the gas undertakers for a number of years was proposed to be used for the erection of a gasification plant. The Warwickshire County Council refused permission on the ground, among others, that the land lay within the green belt area between Birmingham and Coventry. The Board then appealed to the Minister on the ground that the land was operational land and the Minister of Fuel and Power under Section 119 (2) of the Town and Country Planning Act, 1947, decided that it was.

The County Council, who were dissatisfied with this decision because by it they had lost control over the use of the land, applied for an order of *certiorari* to quash the determination of the Minister, but their application was unsuccessful. The question turned on the difficult definition of operational land under S.119 (1) of the abovementioned Act which says:—"Operational land in relation to any statutory undertakers means land which is used for the purpose of carrying on the undertakings of those undertakers and land in which an interest is held for that purpose not being land which in respect of its nature and situation is comparable rather with land in general than with land which is used or in which interests are held for the purpose of the carrying on of statutory undertakings."

This divides itself into two parts. The Court decided as a matter of law that "land in which an interest is held for that purpose" meant that land which could be potentially used in the future could come within the definition as well as land being at present used. The second part of the definition which followed "not being land" was then held to be a matter of fact which the Minister himself by a visit from his inspector on the site could decide. In fact the Minister had found that the land was in proximity to a railway, a sewage works and the Hams Hall power station operated by the Central Electricity Authority and although superficially like agricultural land it was not really so.

The decision is important from the fact that it clarifies the point that operational land need not be land that is used at the moment and it reduces the possibility of Court action in the future on such facts by reaffirming that the Minister's findings are of fact in relation to comparable land. The fact that land is operational land is important for planning purposes because development carried out "on, in or under the operational land of the undertaking" is permitted development and therefore does not require consent (Class XVIII of the First Schedule to the General Development Order, 1950). The two exceptions relate to the "erection or reconstruction of buildings affecting their external appearance" and "the installation or erection of plant, machinery, structures and erections more than 50 feet high."

The operational land of statutory undertakers is governed by special provisions contained in the Fifth Schedule to the Town and Country Planning Act, 1947, governing applications for permission where necessary and compensation for refusal. When operational land is compulsorily acquired then special provisions in relation to compensation are contained in S.84 (4) of the 1947 Act which provides that where the statutory undertakers elect to have compensation based on market value, as they can do under S.2 of the Acquisition of Land, etc., Act, 1919, the compensation is to be assessed on the assumption that planning permission would be granted for any development to make the land correspond with the use prevailing in the case of contiguous or adjacent land.

WALKING BEAM FURNACES

Electrical Equipment for all General Heat Treatment Processes

BY K. RONEY*

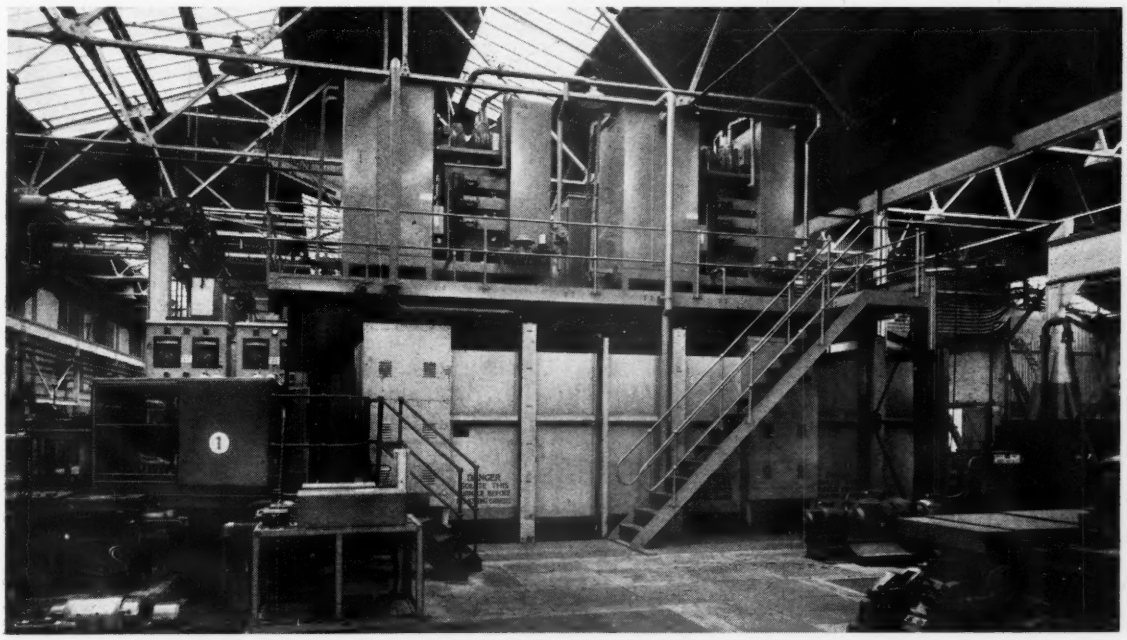
EVER-RISING labour costs and the need for uniformity of product quality are fundamental reasons behind the present trend towards the reduction of physical effort in manufacturing processes. The result is the continued increase in the provision of automatic methods of conveyance which find their counterpart in the modern continuous electric furnace. The continuous heat-treatment of heavy or bulky parts is often considered to be beyond the capabilities of the more orthodox type of furnace employing mesh belts or continuous chains to convey the charge through the furnace. Accordingly, a furnace has been evolved incorporating in its design a system of moving hearth beams giving the installation the name of a " walking beam furnace." Electric furnaces of this type can be used for all general heat-treatment processes—bright annealing, normalising, preheating for forging, hardening, etc.

Furnaces heated electrically are inherently clean since they are free from any products of combustion; it is a comparatively simple matter to introduce artificial atmospheres into the heating chamber for such purposes as bright annealing, these atmospheres being derived from a separate preparation unit giving a product of known and easily controllable composition to suit the particular process, charge and relevant temperature. It is possible to place electric walking beam furnaces directly in the production line in much the same way as is adopted in the case of any other electrically controlled machine tool.

In a walking beam furnace the hearth is composed of one or a series of horizontal longitudinal beams which are arranged to " walk," the remaining portion of the hearth being stationary. The principle of this type of conveying mechanism is illustrated in Fig. 1. The furnace in the upper diagram has two slots in the hearth in which the walking beams move, while the lower sketch illustrates a furnace in which the moving beam constitutes the major portion of the hearth. The moving beams, horizontal at all times, have a motion which is arranged to be as nearly rectangular as possible. The items being treated are lifted vertically clear of the stationary portion of the hearth, are carried forward and lowered again while the moving beams sink below the fixed hearth level, and then return to their former position thus completing an approximate rectangle. In the latest design of walking beam furnace two separate motor-driven mechanisms provide the vertical and horizontal movements; it is generally considered that for most purposes this arrangement is superior in many respects to the alternative eccentric cam method of operation, particularly when it is undesirable for the charge to be subjected to undue abrasive action, and where the installation is relatively

* G.W.B. Furnaces, Ltd.

Side view of a walking beam furnace with G.W.B. exothermic burned town's gas protective atmosphere plant on an overhead platform



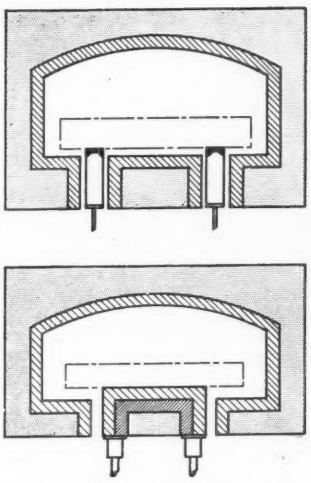


Fig. 1.—Principle of the walking beam

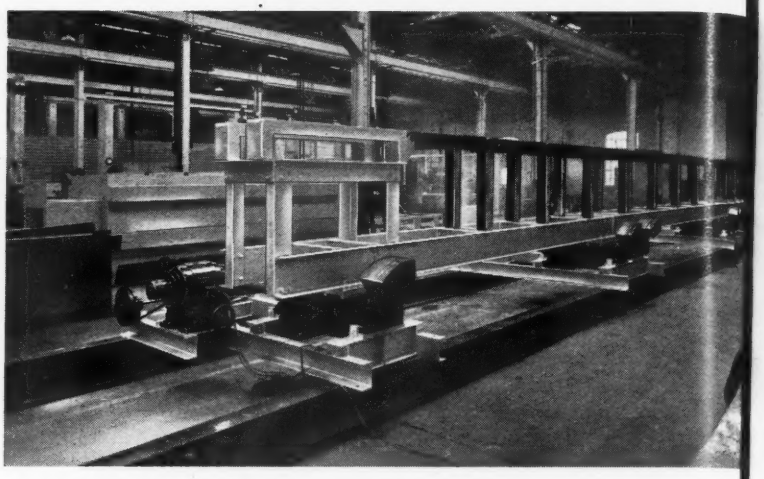


Fig. 2.—Cam type walking beam mechanism being lined up prior to furnace erection

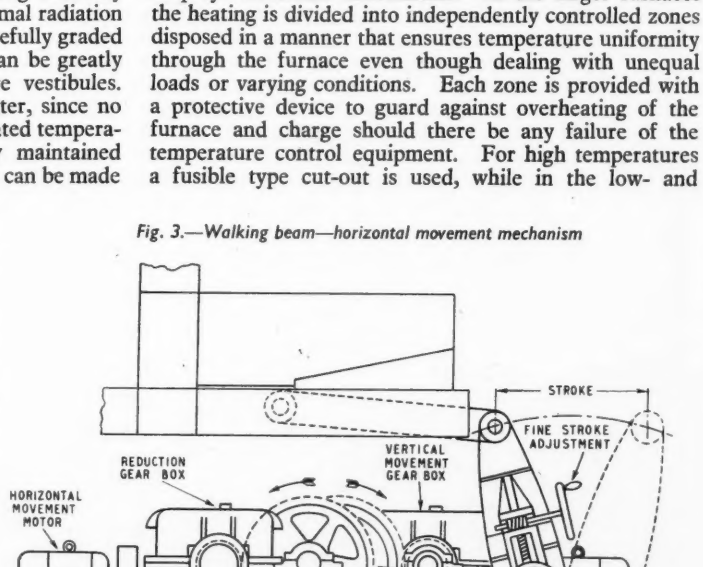
long. As a matter of general interest, Fig. 2 shows a moving beam mechanism of the eccentric cam design as applied to a relatively small furnace. Fig. 3 represents diagrammatically, the other type of walking beam mechanism, this particular section showing the operation of the horizontal movement. Fig. 4 illustrates the " knuckle " action of the vertical movement.

One of the more apparent advantages of this conveying system is the external position of the driving mechanisms which are placed away from the actual heating chamber and, since no part of the effective hearth leaves the chamber as in the case of belt, slat or chain conveyors, the furnace retains more sensible heat for transfer to the charge. This means a considerable operating economy since the heat losses are thus confined to normal radiation which is reduced to the minimum through carefully graded insulation, and from end heat losses which can be greatly cut down by careful design of the furnace vestibules. Maintenance is also a relatively simple matter, since no part of the driving mechanisms reach an elevated temperature and can, therefore, be systematically maintained while the furnace is still up to heat. Full use can be made of the effective hearth area since articles passing through the chamber can be placed at very close centres because their passage is not regulated by links, rollers, or any other restricting devices.

For temperatures up to 750 deg C, it is normal practice to fit fans to provide air or atmosphere circulation, thus speeding up the heating rate, and also ensuring a high degree of temperature uniformity throughout the heating chamber. The fans are driven by individual electric motors by means of vee-ropes, the motor and fan shaft bearings being mounted on a cast steel bracket fixed to the furnace casing roof. Water cooling is applied to the upper portion of the shafts to maintain permissible bearing temperatures.

Heating elements are usually fabricated from 80/20 nickel-chromium alloy, and can be in one of several forms, the most common being the ribbon type element which is held either on specially shaped refractories or by means of wire hooks embedded in the furnace walls and roof; wire coil elements may also be applied, and in some cases, heavy tubular elements can be fitted. The choice of element form largely depends upon the optimum dissipation allowable in watts per square inch in relation to the temperature of the furnace. Electric resistance heating, being free from the limitations imposed by fuel-fired installations, is particularly suitable for accurate temperature control. Temperatures can be reliably controlled in a positive manner to within plus or minus $2\frac{1}{2}$ deg C of the temperature settings. Temperatures are fully and automatically controlled by means of potentiometric or millivoltmeter type controllers, while the latest equipment employs electronic instruments. In the larger furnaces the heating is divided into independently controlled zones disposed in a manner that ensures temperature uniformity through the furnace even though dealing with unequal loads or varying conditions. Each zone is provided with a protective device to guard against overheating of the furnace and charge should there be any failure of the temperature control equipment. For high temperatures a fusible type cut-out is used, while in the low- and

Fig. 3.—Walking beam—horizontal movement mechanism



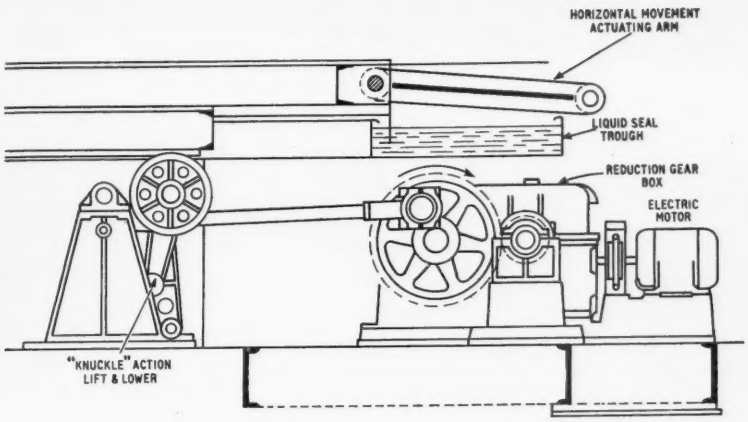


Fig. 4.—Walking beam—vertical movement mechanism

medium-temperature ranges a variable type thermostat is provided. In some cases safety cut-outs may be fitted to the actual instruments controlling the furnace temperature.

One of the latest electric walking beam furnaces is shown in Fig. 5, this being U-shaped from a plan view, comprising an ingoing and outgoing beam situated side by side so that the charge and discharge points are adjacent. Change in travel direction of the charge is effected by means of a transfer car inside the furnace at the bottom of the " U." This furnace is heated by ribbon type heating elements, and the beam movements are effected by two separate motor mechanisms. As stated earlier, this method is considered best in the case of relatively long furnaces, and in this particular instance the length of moving beams is 50ft. The furnace was installed in the Witton Works of Imperial Chemical Industries, Ltd. (Metals Division) by G.W.B. Furnaces, Ltd., and is used for the softening of coiled brass strip between rolling operations. The coils which are being processed weigh about 960 lb each and are usually 63/37 or 70/30 brass: the gauge is generally 0·120in or 0·160in and the strip width is 24½in. An output of 12 coils per hour is obtained, amounting to a total weight of 5·15 tons per hour. The furnace is designed for a maximum temperature of 850 deg C, while the normal working range lies between 550 and 600 deg C. The loading of 603 kW, arranged in nine independently controlled zones, is evenly distributed over the three-phase, 50 c/s supply.

The main heating portion of the furnace is, in effect, a twin chamber with a dividing central wall to assist in efficient air circulation, the length of this double section being 35ft. The furnace walls, roof and hearth are lined with refractory firebrick backed with graded insulation, while the fixed hearth of the furnace, which supports the coils when they are temporarily static, is capped with heat-resisting steel. Five centrifugal fan units are fitted along each length of the heating chamber.

As a continuation of this double heating chamber, a fully bricked and insulated recuperative chamber assists in achieving the highest possible thermal efficiency, since heat is taken up by the ingoing coils from the outgoing charge. Along the outgoing section of the recuperative chamber a series of centrifugal fans provide heat transfer by convective air currents from the hot to the cold coils.

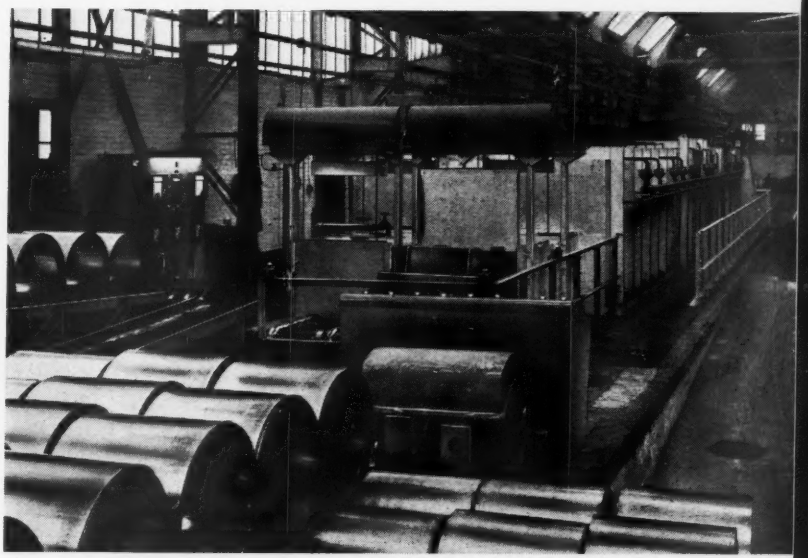
Finally, at the charge and discharge points are fitted short entrance and exit chambers with air or atmosphere locks in the form of lifting metal doors. In the exit chamber high-pressure water sprays are provided for final cooling. To indicate the degree of heat recuperation obtained, it can be stated that the ingoing coils reach a temperature of approximately 250 deg C before entering the actual heating chamber while electricity consumption is around 80 kWh per ton when heating up to 550 deg C.

At this point, it would seem advisable to clarify the whole progress of the charge into and out of the installation as a whole. The coils are received from the preceding rolling operation down an inclined conveyor, the axes of the coils being in the horizontal position. The coils are then up-ended by means of the manipulator in front of the furnace so that the axes are vertical, and they are then transferred to a short slat conveyor section into the entrance chamber through the atmosphere lock outer door.

The moving beam lifts the coils as they arrive from the conveyor, and as the coils reach the bottom end of the furnace the transfer car moves them across to be picked up by the outgoing beam. The beforementioned sequence of operations is then repeated, only in reverse, so that the coils eventually arrive on to the conveyor in the discharge chamber. The entire sequence of operations is carried out automatically, and only one supervisory operator is required for the whole of this heat-treatment process.

Another application of the walking beam furnace can be seen in the two units recently installed at a Royal

Fig. 5.—Four to five ton/hr recuperative U-shaped walking beam furnace showing adjacent charge and discharge doors



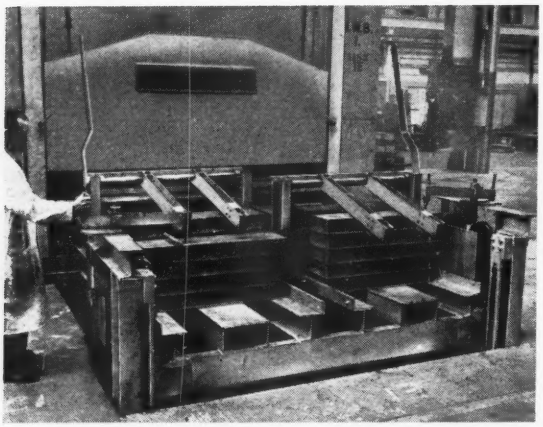


Fig. 6.—Magazine type loading mechanism at charging end of twin-track walking beam furnace heating brass slabs

Ordnance Factory (Fig. 6) for the preheating of brass slabs prior to rolling. Each of these furnaces is of the twin-track design which affords considerable economy in the floor space required. In effect, two rows of slabs are transferred through the furnace at the same time, while individual charge and discharge for each track are arranged to suit production at the rolling mill. As an indication of the reason for the choice of this type of continuous furnace, it can be stated that the capacity of each unit is about 17 tons, comprising 48 ingots of 70/30 brass, 40in long by 6in wide by 4in thick.

Each furnace is rated at 1,380 kW, arranged in five heating zones, four of which are controlled independently, while the fifth is connected direct-on-line through a transformer and a suitable contactor. Nickel-chromium strip heating elements in sinuous form are arranged over the side walls and under the arched roof of the heating chamber, and rib type elements are fitted in the fixed parts of the furnace hearth. Each half or track of the furnace hearth consists of three fixed portions with two moving beams between.

The beam operating gear again consists of two separate motor-driven mechanisms, one for the horizontal movement and one for lifting. The understructure of the beam is supported at intervals by a series of six free-roller devices running on pads fitted to the underside of the beam structure, balance weight boxes being suspended from extension arms from the roller shafts.

Labour requirements are reduced to the absolute minimum. Ingots are conveyed by fork truck to the specially designed magazine type loader fitted in the front of each track. The ingots are raised to furnace hearth level by the electrically-driven lifting unit until the top ingot can be transferred to the charge table. This top ingot is then pulled off the pile by two claws carried on a frame attached to the end of the moving beam, the forward movement of which causes the ingot to be transferred to the charging table. At this point the lifting unit automatically comes into operation and raises the pile until another ingot is in the position to be transferred. The discharge gear (Fig. 7) is electrically operated and comprises two arms for each track which move forward and engage in slots cut on each side of the end of the walking beam to lift the ingots and transfer them one at a time on to the mill table rollers. It will be seen from the accompanying photograph that these arms move between the rollers.

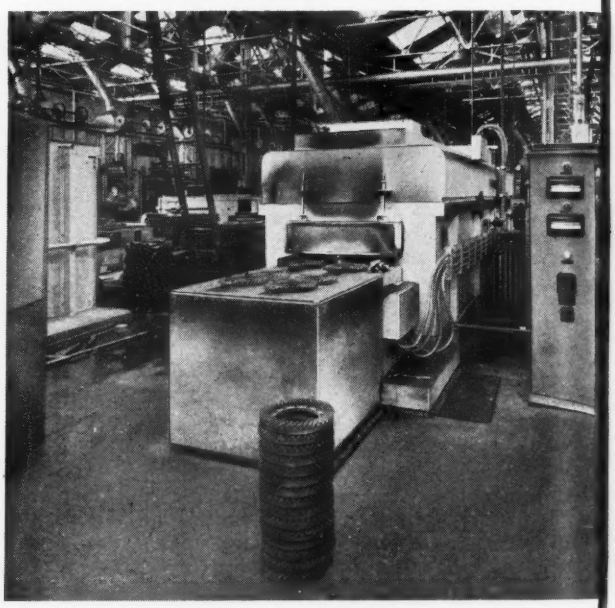


Fig. 8.—140 kW resistance heated walking beam furnace for hardening and refining motorcar driving gears. Output: thirty 35 lb gears an hour

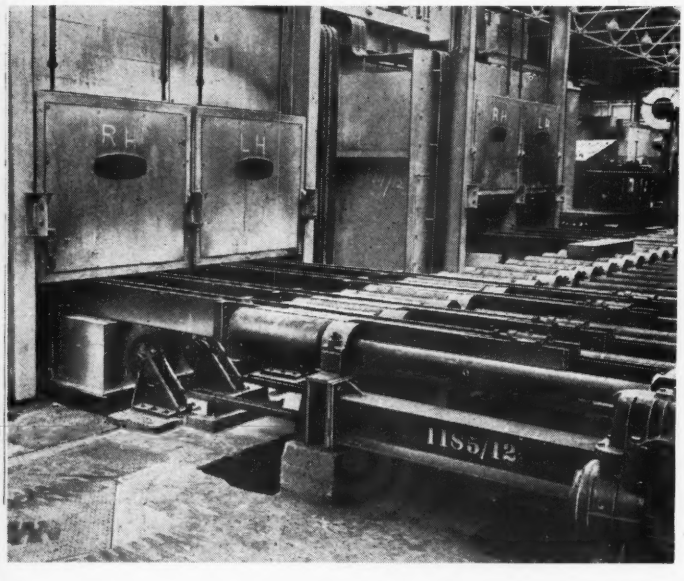


Fig. 7.—Discharge ends of two twin-track electrically heated walking beam furnaces for heating brass slabs before rolling. Slab shown on driven roller table leading to rolling mill

To reduce oxidation of the ingot surfaces to the minimum a protective atmosphere is introduced inside the heating chamber, this coming from a separate exothermic burned town's gas plant. Again, in order to cut down the floor space required, all the protective atmosphere equipment, together with the contactor gear and automatic temperature control panels, is fitted on a platform straddling the two furnaces.

Another application of the walking beam furnace, the beams being operated in this case by an eccentric cam mechanism, is shown in Fig. 8 being used for the harden-

ing and refining of gear wheels. Driving gears 12·66in in diameter by 1·8in thick, each weighing 35 lb, are shown passing through the furnace which is rated at 140 kW in two independently controlled heating zones. An output of 30 driving gears per hour is obtained, and after hardening, the wheels are lifted from the discharge point of the furnace and placed into an adjacent quenching press. Protective atmosphere derived from an exothermic burned town's gas plant is introduced into the furnace to prevent excessive oxidation of the wheels.

The first two installations described above deal with heavy, bulky items, while the third, which is a smaller furnace altogether, deals with smaller components. While the walking beam furnace is ideal for the heavier charges, it can also be used for treating smaller parts which may be loaded into trays or containers and then passed through the furnace in the manner described.

To sum up, the electric walking beam furnace has numerous points in its favour such as cleanliness, compactness, easy application of protective atmospheres, small labour requirements and the ability to cater for heavy loads.

NEW BOOKS

Television Engineering: Principles and Practice. Vol. III: Waveform Generation. By S. W. Amos, B.Sc. (Hons.), A.M.I.E.E., and D. C. Birkinshaw, M.B.E., M.A., M.I.E.E. Pp. 226; figs. Published for *Wireless World* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 30s.

This is the third volume of a textbook on television engineering written by members of the B.B.C. Engineering Division, primarily for the instruction of the Corporation's staff. The work is intended to provide a comprehensive survey of modern television principles and practice. It explains the application in television of sinusoidal, rectangular, sawtooth and parabolic waves and shows the mathematical relationship between them. The main body of the text is devoted to the fundamental principles of the circuits commonly used to generate such signals, the treatment being largely descriptive in nature and therefore less mathematical than that of the previous volume.

Volume I deals with fundamental television principles, camera tubes, television optics and electron optics, while Volume II describes the fundamental principles of video-frequency amplifiers. Volume IV, which will complete the series, will deal with a wide range of circuit techniques.

Electrical Installations—A Handbook for Architects and Assistants. Edited by Brian Grant. Pp. 99; figs. Architectural Press, Ltd., 9, Queen Anne's Gate, London, S.W.1. Price 16s.

This book is a succinct and accurate summary of the essentials in building electrical installations. It is not highly technical, and is planned by its editor to provide architects and their assistants with the essential information on planning and supervising such work where no consultant is employed; and also to assist them in their understanding when working in co-operation with electrical consultants.

The six original authors of the articles from which the book is constructed include well-known names in the electrical world and as a factual informatory work it is first-class. Throughout there is strong emphasis on the need for advanced planning of duct and conduit systems, this being increasingly important with modern methods of building construction.

It is to be hoped, however, that architects will not be encouraged by this work to specify installations. The old tag of "a little learning . . ." is very pertinent and while the descriptive account of electrical practice in this book is good and accurate it does not cover (nor does it pretend to) the background and reasoning by which one thing may be chosen in preference to another.

Although primarily intended for architects, this summary is well worth reading by every electrical engineer and contractor concerned with installation work, because it brings out so many of the architect's difficulties; and working together on a large building can be made much smoother if all parties have a clear understanding of the others' difficulties.—H.R.M.

Glass Reinforced Plastics. Edited by Phillip Morgan. Second Edition. Pp. 326; figs. 61; art plates 50. Published for *British Plastics* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 46s 6d.

The text for the latest edition of this book has been thoroughly revised and many of the original chapters have been completely rewritten. In addition, there are completely new chapters on epoxide resins, the resin injection moulding process and on chemical plant applications. The general shape of the book remains unchanged. It sets out to present the facts on the raw materials, i.e. the resins and glass, to describe the fabrication techniques now in use and to discuss some of the problems of specialised applications.

While all important resins are dealt with, polyesters, being most widely employed, are described in more detail than the other resins. Techniques included are the standard commercial moulding processes, methods of mass production, resin injection and the manufacture of tube and rod. The major fields of application which are described are the automobile, aircraft, body building, electrical uses and chemical plant. While these are given detailed treatment, the last chapter discusses a number of other important applications which are outside the fields already listed.

BOOKS RECEIVED

Electrical Engineering, Electric Power, Telecommunications and Electronics. By D. O. Bishop, Ph.D., B.Sc.(Eng.), M.I.E.E. Pp. 107; figs. Robert Hale, Ltd., 63, Old Brompton Road, London, S.W.7. Price 8s 6d.

Theory of Networks in Electrical Communications and Other Fields. By F. E. Rogers, A.M.I.E.E. Pp. 560; figs. MacDonald & Co. (Publishers), Ltd., 16, Maddox Street, London, W.1. Price 65s.

Automation in Business and Industry. Edited by Eugene M. Grabbe. Pp. 611; figs. A John Wiley Book. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 80s.

Electrical Discharges in Gases. By F. M. Penning. Pp. 78; figs. Philips' Technical Library book distributed in Great Britain and Eire by Cleaver-Hume Press, Ltd., 31, Wright's Lane, Kensington, London, W.8. Price 15s.

Factory Law (6th Edition). By H. Samuels, M.A. Pp. 734. Stevens & Sons, Ltd., 119 & 120, Chancery Lane, London, W.C.2. Price 90s.

Engineering in Europe

ABSTRACTS FROM FOREIGN TECHNICAL JOURNALS

ALTHOUGH the phenomena accompanying the disconnection of idling lines have often been studied during system tests, this method can only furnish information about the surge voltages set up under the given system conditions and with the breakers used, since neither system nor circuit-breaker parameters can be varied systematically. Only a statistical evaluation of the results was therefore possible. Modern a.c. network analysers are now capable of representing not only a wide variety of system configurations and operating conditions, but also most of the types of circuit-breakers actually used with their relevant characteristics.

Of the greatest interest in this respect is the recovery rate of the dielectric strength in the break. This may be modelled by grid-controlled thyratrons. The paper surveys the underlying principles of such investigations on a network analyser and describes the equivalent circuits representing circuit-breakers during the sucessive stages of the switching operations. The theoretical method of checking the results obtained on the analyser by calculations using data from tests on the real system is also indicated. Investigations on systems with isolated resistance and reactance earthed neutrals are then reported and discussed. Satisfactory agreement between the results of the measurements on the analyser and on the actual systems was obtained in all cases.—" A Contribution to the Investigation of the Phenomena during the Disconnection of Idling Lines in H.V. Systems," H. Kindler, *E.T.Z.(A)*, Vol. 78, No. 13, pp. 449-457, 1st July, 1957, in German.

Machine Time Constant

It is surprising that so far hardly any attention has been paid to the transient phenomena in the operation of d.c. machines, particularly when it is considered that in the most powerful d.c. drives, viz. reversible rolling mill drives or winding engines, transient operating conditions set important problems. And yet the designers of such machines rely more or less on the automatic control gear to solve the problems of the transient periods for them without investigating how far the machine by its inherent characteristics is controllable during the transient periods. On the other hand, rotating regulators or electrodynamic amplifiers (of the amplidyne, rototrol or regulex types) are d.c. machines predestined to operate mostly under transient conditions, wherefore a general investigation of the transient behaviour of d.c. machines will cover these types as well.

The author's very comprehensive investigation deals with the time constant of the field circuit and the design parameters influencing it, the dynamic amplification factor, the e.m.f. transient, voltage amplification factor, multi-field machines (including amplidynes, etc.), time constant of currents induced in frame, electromechanical time constant of separately excited machines, energy absorbed during starting, equivalent circuit of a constant-flux motor, combined effect of electromechanical and electromagnetic time constants in a constant-flux motor; and calculation of transients and consideration of the time constants and their effects in design parameters.—" The Time Constants of a D.C. Machine," U. Lugo, *Elettrotecnica*, Vol. 44, No. 1, pp. 2-19, 1957, in Italian.

Three-Phase Motor Controllers

The question of the conclusiveness of tests on motor control gear with equivalent circuits consisting of resistances and inductances and representing the motor to be disconnected is still under discussion. Particularly, the question whether the contact wear on disconnecting the motor is the same as when the " mock-up " is switched out, and the different stressing of the contacts in disconnecting running and locked motors, have yet to be clarified. Also, much depends on whether the full mains voltage or only a difference between the latter and the voltage maintained in the windings by the motor field determines the stresses on the contacts; lastly, the influence of the arc voltage must not be neglected.

These problems are analysed in the paper, which also considers the question of the most representative power factor for such tests and the difficulty of providing equivalent circuits of very low power factor (below 0·4). It is found that arrangements working with a voltage corresponding to the voltage drops in the stator and leakage reactances and resistances, respectively, on short circuit are unrealistic, since these drops increase during the arcing period. The voltages recommended are therefore about 30 to 40 per cent of the mains voltage. The p.f. should be 0·4 or less, if possible.—" The Behaviour of Motor Controllers when Disconnecting Three-Phase Induction Motors," H. Franken, *E.T.Z.(A)*, Vol. 78, No. 13, pp. 458-462, 1st July, 1957, in German.

Single-Phase Reclosing

Since the great majority of outages of overhead lines is due to single-phase-to-earth faults, and the supply can in such cases be kept up over the two sound phases, the idea of single-phase reclosing has much attraction and is coming to be more generally adopted. It should be noted that, since two-phase-to-earth short circuits imply loss of stability of the system, two-phase reclosing is not practised; normal three-phase reclosing is carried out in such cases. Obviously, the full advantages of single-phase reclosing are obtainable only if the special equipment required for it works reliably, and a proper technique of operations has been evolved.

The circuit-breakers designed for this purpose must represent units consisting of three single-pole breakers with separate drives and also capable of working synchronously as normal three-phase breakers. Comprehensive field tests carried out since 1945 on 150 and 220 kV lines, and since 1953 in the Fontenay Research Station, of Electricité de France, are analysed in full detail in the well-documented paper; this is supplemented by a report on short-circuit tests in a Czechoslovakian 220 kV system. The latter not only refers to the performance of switchgear and relay equipment used for reclosing, but also reports measurements of the RRV, natural frequency of the system, etc., carried out on this occasion and discussed by the author.—" Single-Phase Reclosing and its Testing by Artificial Short Circuits," L. Postler, *Elektrotech. Obzor*, Vol. 46, No. 6, pp. 310-317, 1957, in Czech.

Readers who require accurate full translations of any of the articles abstracted in this section can be put into touch with the translators who will supply them at current rates.—Editors, *Electrical Review*.

VIEWS on the NEWS

By REFLECTOR

CALDER HALL was officially connected to the national grid last October and has since been making a sizeable contribution to the public electricity supply. It is a measure of this country's headway in harnessing the atom for peaceful purposes when it is reported in the *Electrical World* (New York) that an initial megawatt of nuclear power was provided to the Southern California Edison Co. on 12th July from the Atomic International experimental sodium reactor. The occasion is described in this way:—

> "Another milestone along the road to civilian nuclear power went by as the switch closed. It was the first time a non-military reactor had produced power for electric generation by a private utility."

The report goes on to explain that the plant is expected to achieve full power rating of 20 MW thermal and 6·5 MW electrical later this year. It is reported by the same journal that

> "a showdown between U.S. and U.K. reactors is sought by the World Bank. A 7-man international panel of experts will compare the Calder Hall and enriched uranium liquid cooled systems before the Bank and Italian Government decide who gets the contract to build a 150 MW power reactor in Southern Italy."

* * *

Sir Charles Wheatstone occupies a prominent place in electrical history for his work in telegraphy and notably, of course, for the "bridge" circuit which bears his name. Until I saw it in *The Times* last week I was (in company with most of my readers I suppose) quite unaware that Wheatstone was also the inventor of the concertina. He came from a family of musical instrument makers and he was also responsible, says *The Times*, for "a mechanical violin which was both played and fingered by machinery." Let us continue to remember Wheatstone for his telegraph.

* * *

A Reuter note published in the *Evening News* says that a Japanese concern has concluded a £200,000 contract for two 22,000 kVA hydro-electric generators with the Mexican Government. At something under £5 per kVA this looks distinctly like cut-throat competition.

* * *

I feel that we have had about enough of the marvellous "push-button" kitchens which are designed in America, regardless of expense, and publicised in this country as though they were about to become a standard feature of the American way of life. Another of these was recently described in the *Evening Standard*, although in this case it was admitted that "it may be a long time before the vision of a workless kitchen comes true for the ordinary housewife." The article started off:—"In the kitchen of to-morrow the housewife will have a machine to choose what to eat. . . ." But she may prefer to choose for herself.

* * *

Delivery of bills by Electricity Boards' employees may not be approved by all consumers. The *Weekly Scotsman* (Edinburgh) relates the case of Lord Belhaven and Stenton who has told the South of Scotland Board that in future he will pay his accounts only if they are sent to him by post. He has protested in a letter to the Board because one of its employees called at his house and presented him with a bill for material bought in Castle Douglas; he describes the Board's methods as "uneconomical, brash and rude." In an interview he said:—

> "I think this is a lunatic way of collecting bills. I object to people banging on my front door, especially when they are demanding money."

The Board's answer is that the personal call was made only after the sending of an account and subsequent reminders.

* * *

A correspondent draws my attention to the latest line in American mousetraps which is sprayed with an "electronically conductive" metal film. It is claimed that it "kills up to five mice at one setting" and the makers, the Admiration Plastic Co., Deerfield, Illinois, call it the "Electronic Cat."

* * *

Electrical scientists have always been attracted by the idea of producing electricity directly from fuel and work is still proceeding on the fuel cell. A very different device was described in a paper by Thomas A. Edison reproduced in the *Electrical Review* of 9th September, 1887. This was a "pyromagnetic dynamo" constructed by the great inventor. It depended for its action on the variation of a body's magnetism by heating and cooling. Broadly, the machine consisted of a bundle of small tubes of thin iron rotatable between the poles of permanent or electromagnets. A blast of hot air was passed through the tubes, raising them to red heat. By means of a screen half of the tubes at a time were cut off from the hot blast and the resultant increase in magnetism in them caused this part of the bundle to be acted upon by the magnets, making the bundle rotate and thus bringing the other half under the screen—and so on. Currents induced in the windings on the magnets were "collected" by rings and brushes. Methods of construction were detailed but Edison said that "to furnish 30 sixteen-candle lights in a dwelling house would probably require a pyromagnetic generator weighing two or three tons." He pointed out, however, that the excess heat could warm the house and altogether he was optimistic about its usefulness.

Wiring Regulation Interpretations

A FOURTH set of interpretations of the I.E.E. Regulations for the Electrical Equipment of Buildings (13th Edition), made in reply to inquiries, was issued this week. Notes on certain of the regulations indicate methods of compliance with their requirements which have been found satisfactory, but they do not express the only acceptable methods and are not mandatory.

An overhead enclosed busbar system feeding individual motors through plug-in fused outlet units, constituting the only isolators for maintenance of each control unit, would be in order under Reg. 315(B2) if the means of isolation are suitably placed. Attention is drawn to the requirements of the Electricity (Factories Act) Special Regulations 1908 and 1944 and to the Memorandum thereon (Form 928, Stationery Office).

Regulation 115 refers to a cooker control unit (made to B.S. 438 or 1833) supplied from a 30 A final sub-circuit. An electric kettle and a refrigerator or water-heater can often be operated from a single socket-outlet provided in the cooker control unit. Where in a new installation additional provision is required and a suitable final sub-circuit (such as a ring circuit) is not planned, other arrangements must be considered, taking into account the cooker demand. If, for example, a final distribution board can be installed near the cooker control unit, the cable between such board and the consumer's supply controls would become a sub-main and subject to Regs. 203, 204 and 111 and protected in accordance with Reg. 108 (see CP 322.103 in regard to small dwellings).

Inspection elbows and tees are permissible at draw-in points and where else suitable having regard to the size of cable, subject to 207(G). Where however a junction involves a cable connection or where 207(G) applies, substantial boxes complying with B.S. must be installed; these may be used also wherever inspection elbows and tees are allowable.

As the regulations do not at present provide for p.v.c.- or polythene-insulated cables to be bedded and armoured and served with p.v.c., their use would not comply with requirements.

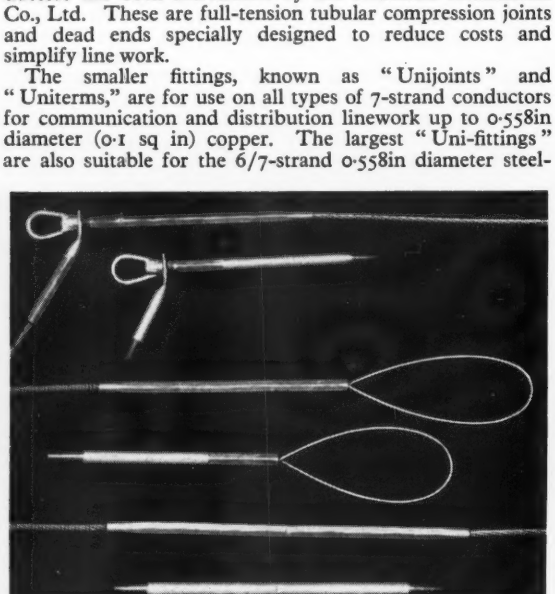
The regulation, 405(C), which precludes the making of provision for portable appliances in a room containing a fixed bath, does not prohibit the installation of a socket-outlet, out of normal reach, for supplying a fixed heating appliance complying with B.S. 1670. No electric fire may, however, be so installed as to be detachable without the use of tools, if it could be used elsewhere in the bathroom as a portable appliance. Exemption from Reg. 314(A) is not obtained by installing a fire out of reach, but a fixed panel fire complying with B.S. 1670 has a double-pole switch, and removes the need for an external switch if the requirements of 314 (A) and (B) are satisfied. In a bathroom the means of disconnection can conform to either 405(B) or 314(B3).

Bonding of the earth-continuity conductor to the metal pipes of other services or to baths, sinks and tanks is in general required where its segregation from them is impracticable. Cable sheaths, armour, conduit, ducts or trunking, if installed near a metal bath, would thus need to be bonded to the earth-continuity conductor for this reason, not because water pipes or the bath waste-pipe are bonded to it elsewhere. An adjustable thermostat comes within the scope of Reg. 405(B) and must therefore be out of reach of a person in contact with a fixed bath.

Aluminium Overhead Line Fittings

A NEW range of accessories for aluminium overhead conductors has been introduced by the Northern Aluminium Co., Ltd. These are full-tension tubular compression joints and dead ends specially designed to reduce costs and simplify line work.

The smaller fittings, known as "Unijoints" and "Uniterms," are for use on all types of 7-strand conductors for communication and distribution linework up to 0·558in diameter (0·1 sq in) copper. The largest "Uni-fittings" are also suitable for the 6/7-strand 0·558in diameter steel-cored aluminium conductor. The "Unijoint" is a single extruded aluminium sleeve into which the two ends of the conductor are inserted; for the positioning of the conductors in the joint, the sleeve has an indentation in the centre. The sleeve is then compressed on to the conductor, starting at the centre and working outwards, using a mechanical hand tool for the smaller conductor or a 10-ton hydraulic compressor for larger sizes. The "Uniterm" is intended for dead-ending and can be supplied with or without jumper terminals.



"Uniterm" with jumper terminal (top), wire-loop type (centre), and "Unijoint"

The "Uni-fittings" are pre-filled with a special jointing compound and sealed with a plastic cap. The compound greatly increases the friction between the sleeve and the conductor strands so that joints made with a single sleeve develop the rated ultimate strength of the conductor. With steel-cored aluminium conductors these joints eliminate the comparatively laborious method of measuring and cutting back the aluminium strands, compressing a steel sleeve over the steel core wire and applying jointing compound and finally fixing an aluminium sleeve over the entire assembly.

It is claimed that laboratory and field tests have proved that after 300 hours of temperature cycling, tensile tests on joints made with "Unijoints" and "Uniterms" showed no loss of strength, and electrical resistance tests taken before and after current cycling showed the resistance of the joint to be well below that of an unjointed conductor.

The larger fittings (over 0·558in diameter), known as "Noral" tubular conductor accessories, are for use on h.v. transmission lines. They are also fabricated from aluminium extrusions and the range covers all those fittings previously produced by the casting process. The fittings have received the approval of the C.E.A. after extensive tests. Hexagonal compression is employed using standard compressors, which ensures a fully homogeneous joint.

PERSONAL AND SOCIAL

News of Men and Women of the Industry

Mr. H. E. Cornish, O.B.E., M.C., B.Sc.(Eng.), A.C.G.I., M.I.E.E., whose appointment as general manager of British Telecommunications Research, Ltd., we briefly reported in our last issue, was, as Postmaster General of Sarawak, largely responsible for the rapid development of communications in Sarawak for which he was made an O.B.E. Previously, he had for many years served in various engineering and administrative capacities in Malaya. During the war years he was with the Nigerian Posts and Telegraphs Department and later, as a major, in the British Military Administration in Malaya. In 1948, he was appointed Controller of Telecommunications in Malaya, and subsequently P.M.G. of Sarawak. As we have already reported, he succeeds **Sir Archibald Gill,** who now becomes chairman of British Telecommunications Research, Ltd.

Mr. H. E. Cornish

Mr. A. I. Mackenzie, C.A., and **Vice-Admiral Sir Frank Mason,** K.C.B., have been appointed directors of Metal Industries, Ltd. Mr. Mackenzie is a partner in the firm of Brown, Fleming & Murray, chartered accountants, Glasgow, and since 1951 has been a part-time member of the North of Scotland Hydro-Electric Board. Vice-Admiral Sir Frank Mason is the retiring Engineer-in-Chief of the Fleet. He is a vice-president of the Institute of Marine Engineers and of the British Internal Combustion Engine Research Association, and is a member of the Council of the Institution of Mechanical Engineers.

F. Perkins, Ltd., announce that **Mr. B. Dyer** has been appointed general manager of their planning division, and **Mr. G. Smith** becomes deputy general manager of the manufacturing division. Both have been deputy planning controllers of the company since 1955 and their new appointments date from 1st September.

Mr. Earl H. Martindale, an electrical engineer of Cleveland, Ohio, who founded the Martindale Electric Co., Ltd., in London, has lately retired from the board of the company which is now entirely British owned, the controlling director being Mr. F. R. Stanley. The other members of the board are Mr. L. H. Davies, F.C.A. (chairman), Mrs. B. M. E. Stanley, Mr. P. H. A. Bowman and Mr. B. J. Ashurst, F.C.A. Mr. Stanley has recently returned from a visit to Cleveland, Ohio, where he presented Mr. Earl H. Martindale with an inscribed silver salver, subscribed for by the employees of the British company.

Following the appointment of Sir Christopher Hinton, K.B.E., F.R.S., as chairman of the Central Electricity Generating Board, **Sir Leonard Owen,** C.B.E., at present director of engineering and deputy to the managing director of the Industrial Group of the United Kingdom Atomic Energy Authority, has been appointed managing director of the Group from 1st September. Sir Leonard, who is sixty, has been engaged in the development of Britain's atomic energy programme since 1946, when he was appointed director of engineering on the production side by the Minister of Supply. He is a member of the Council of the Institution of Civil Engineers and a member of the Institutions of Mechanical and Chemical Engineers.

Mr. E. F. Lyne has been appointed regional lighting engineer in the North West Region of the A.E.I. Lamp & Lighting Co., Ltd. Mr. Lyne received his technical training at Northampton Polytechnic while employed in the Research Laboratories of Standard Telephones & Cables, Ltd., and in 1939 was appointed Birmingham office lighting engineer of Philips Electrical, Ltd., specialising in mercury and sodium discharge lamps. In 1954 he joined the Liverpool office of the British Thomson-Houston Co., Ltd., and in 1956 transferred to the North West regional head office of the A.E.I. Lamp and Lighting Co., Ltd., at Trafford Park.

Mr. E. F. Lyne

Mr. A. F. Peart has been appointed manager of the London offices at 28, Victoria Street, Westminster, S.W.1 (telephone, Abbey 5347), of V. L. Farthing & Co., Ltd. He will serve the company's interests and those of its associate companies.

Mr. T. T. Wood has been appointed commercial officer of the Clyde Area of the South of Scotland Electricity Board, in succession to **Mr. H. R. Taggart** who retires on 8th October. Mr. Wood is at present principal assistant in the Commercial Department of the Clyde Area.

Mr. Taggart and Mr. Wood have had thirty-five and twenty-three years' service respectively in the electricity supply industry, and have held their present appointments since 1948, when the industry was nationalised. Previous to that both were employed by the former Clyde Valley Electrical Power Co., Ltd.

Mr. R. F. Flack has been appointed sales manager of Measuring Instruments (Pullin), Ltd., and he will be responsible for the company's home and export sales divisions. Mr. Flack received his training in electrical engineering with the County of London Electric Supply Co., Ltd. During the war he served in the Royal Engineers, 8th Army, and upon the liberation of Rome in 1944 he reorganised the city's power supply after its destruction by the enemy. Since 1946 Mr. Flack has held senior executive posts with companies specialising in the electronic and nucleonic fields, and immediately before joining Measuring Instruments was sales manager with Newport Instruments (Scientific & Mobile), Ltd.

Mr. R. F. Flack

Mr. G. P. Belsham has resigned as managing director of Brookhirst Switchgear, Ltd., and is retiring from active executive duties. He will, however, continue his association with Metal Industries, Ltd., the parent company, in an advisory capacity. Mr. Belsham was assistant works manager of the Igranic Electric Co., Ltd., from 1929 to 1940 and works manager from 1940 to 1943. In the last mentioned year he became works manager of Brookhirst Switchgear, Ltd., and joined the board in 1948, being appointed managing director in 1951.

Mr. G. P. Belsham

A buffet-dance (evening dress) in aid of the **Electrical Industries Benevolent Association** will be held on 27th September at the G.E.C. Magnet Club,

Birmingham. Music for dancing will be provided by Hedley Ward's band and dancing will be from 8 p.m. to 1 a.m. Tickets (£1 inclusive) can be obtained from Mr. R. Phillips, General Electric Co., Ltd., Magnet House, Newhall Street, Birmingham.

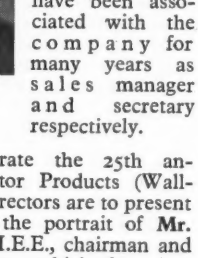
Mr. A. H. Olson, B.Sc., A.C.G.I., M.I.E.E., managing director of Courtney, Pope (Electrical), Ltd., and a director of Courtney, Pope, Ltd., and Mrs. Olson have left for a tour of the United States. Mr. Olson's activities will include a visit to the American Illuminating Engineering Society's conference at Atlanta and delivering lectures on current store lighting practice as well as an investigation of the export market with a view to expanding sales of lighting fittings in the United States and Caribbean areas. Mr. Olson, who is on the Council of the British Illuminating Engineering Society, is being entertained by various notabilities in the American lighting world, and will be paying a visit to the American General Electric Co.'s laboratories at Nela Park while in the States.

Mr. L. J. Greener has been appointed to the board of T.D.L. Electrical Distributors, Ltd., and **Mr. J. E. Haskins** has been appointed director and secretary. Both Mr. Greener and Mr. Haskins have been associated with the company for many years as sales manager and secretary respectively.

Mr. L. J. Greener

To commemorate the 25th anniversary of Victor Products (Wallsend), Ltd., the directors are to present to the company the portrait of **Mr. R. W. Mann,** M.I.E.E., chairman and managing director, which has just been completed by Cowan Dobson, the portrait painter.

Mr. G. H. S. Pawsey, who has been sales office manager with Welwyn Electrical Laboratories, Ltd., Bedlington, Northumberland, since 1946, has been appointed sales and export manager of the Sturdy Electric Co., Ltd., Newcastle-on-Tyne. He commences his new duties later this month.



Mr. G. H. S. Pawsey

Pye, Ltd., has entered the atomic energy engineering field and is manufacturing special television equipment and master slave manipulators, and are equipping a hot laboratory for Dounreay. To co-ordinate and expand these activities at home and abroad, **Mr. V. B. Hessen,** A.M.I.E.E., has been appointed as manager of the Atomics Division. He has recently left the Ministry of Supply, Directorate of Electrical and Mechanical Equipment, to take up this post.

A. Reyrolle & Co., Ltd., announce the appointment of **Mr. W. B. Fenwick,** M.I.E.E., as general works manager in succession to Mr. T. McCulloch, whose death we recently recorded. Mr. Fenwick served his works apprenticeship with the company and after works and drawing office experience was attached to the Contracts Department. Following specialist responsibility from 1940 to 1946, he was in charge of the Power Supply Switchgear Division (Home Contracts) until 1951 when he was appointed East Midlands area manager, establishing new offices in Nottingham. In 1956 he returned to the works to take up the post of deputy works manager.

Mr. W. B. Fenwick

The next luncheon of the **Electrical Industries Club** will be held on 10th September (12.30 for 1 p.m.) at the Connaught Rooms, London, W.C.2, when the guest speaker will be Mr. N. Boydell.

Mr. G. M. Wolfe, joint managing director of Wolf Electric Tools, Ltd., is leaving for Canada in mid-September on the first stage of a three months' business tour. Other countries which he will visit will include New Zealand, Australia, Malaya, Thailand and India.

The Council of the **British Institution of Radio Engineers** has announced the awards of premiums to authors of papers which were published during 1956.

The senior award, the *Clerk Maxwell Premium,* has been made to Mr. K. D. Froome, Ph.D. (Metrology Division of the National Physical Laboratory), for his paper "Microwave Determinations of the Velocity of Light."

Other awards are as follows:—*Heinrich Hertz Premium:* Mr. A. G. Edwards, Ph.D. (A.E.I. Research Laboratories), for his paper on "The Effects of Atmospherics on Tuned Circuits." *Brabazon Premium:* Mr. K. E. Harris, B.Sc. (director of research, Cossor Radar, Ltd.), for his paper "Some Problems of Secondary Surveillance Radar Systems." *Louis Sterling Premium:* Mr. A. van Weel, Dr. Techn. Sc. (Philips Research Laboratories, Eindhoven, Holland), for his paper "Some Remarks on the Radio-frequency Phase and Amplitude Characteristics of Television Receivers." *Marconi Premium:* Professor P. M. Honnell, Ph.D. (Department of Electrical Engineering, Washington University, St. Louis, U.S.A.), for his paper "Prescribed-Function Vibration Generator." *Dr. Norman Patridge Memorial Award:* Mr. H. J. Leak for his paper "High Fidelity Loudspeakers: the Performance of Moving Coil and Electrostatic Transducers."

OBITUARY

Mr. J. W. Kendall.—The death occurred on 24th August at the age of forty-nine of Mr. James William Kendall, head of the Nuclear Engineering Development Department of John Thompson, Ltd. He was one of Britain's leading authorities on the design of gas-cooled graphite-moderated reactors. Mr. Kendall joined John Thompson in a senior advisory capacity, from the United Kingdom Atomic Energy Authority (Industrial Group) in June, 1956. With the U.K.A.E.A. he had been engineer-in-charge of design and construction of projects including Harwell BEPO, the Windscale production piles and the Dounreay fast-breeder reactor. He was one of the original twelve of the Risley Atomic Group, Ministry of Supply, which later became the Industrial Group of the U.K.A.E.A. During the war he was assistant director, filling factories, working with Sir Christopher Hinton.

The late Mr. J. W. Kendall

Institution of Civil Engineers

In a few days time the 23,000 members of the Institution of Civil Engineers will be receiving copies of the new monthly *Proceedings* into which is incorporated a section entitled "News," the successor to the magazine *Chartered Civil Engineer* which ceased publication in July. This change also marks the end of the distribution of advance copies of papers before meetings, since these will now be printed in the *Proceedings* a month ahead. About six months later, the discussion of the papers, both oral and written, will appear.

A section entitled "Minutes of Proceedings" will be at the end of the volume reporting the business of each meeting, including elections, transfers, and admissions. Obituaries will also be published. Separate copies of papers can be provided about a week prior to the meeting concerned at a cost of 2s post free to members and 4s to non-members.

INDUSTRIAL NEWS

Cooker Production at Inverness

Mr. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board, at a Press conference in Glasgow on 30th August announced the early development of a new industry in the Highlands. He said that the General Electric Co., Ltd., had decided to make a start with the assembly of electric cookers at Inverness. For a beginning, the new factory would employ about thirty people this autumn. A lease of existing buildings had been secured, and it was hoped, in time, to develop production, not only of electric cookers, but of other appliances and to ultimately employ many times the initial numbers. Initially it was intended solely for assembly work and would produce between 4,000 and 5,000 electric cookers per year. At the start, those employed will all be recruited locally and trained by the G.E.C. Sale and distribution of the cookers will be handled through the company's Inverness sales branch which has been established in the town for over twenty-one years.

Radio Show Opening

Speaking at the opening of the Radio Show, Earls Court, on Wednesday last week, Mr. Aubrey Jones, Minister of Supply, said that the electronics industry was the spearhead of our industrial advance. He referred to four large customers of electronics—defence, entertainment, industry and exports. The export trade had grown since the war from £2,000,000 to £4,000,000. The requirements the armed forces placed on the industry were extremely exacting. Regarding entertainment, the Minister said that the Show was taking place at the time of the 21st anniversary of the first showing of television in Britain; we had gone a very long way since then. There was a tremendous multiplicity of demands upon the industry. This was a difficult task and quite a formidable challenge, but he thought the industry would meet it.

Neutron Source Tube Production

The first commercial production in this country of neutron source tubes (which will start up the two reactors at the Bradwell nuclear power station) is to be undertaken by the Tube Investments subsidiary, the Talbot Stead Tube Co., Ltd., on behalf of the Nuclear Power Co., Ltd.

Rubber and Plastics Conference

The Institution of the Rubber Industry and the Plastics Institute are holding their first joint conference on 27th February next, probably in the building of the Institution of Civil Engineers, Great George Street, Westminster, S.W.1. The subject will be, "Recent Advances in Polymer Technology." There will be two general lectures, and parallel sessions of papers in the morning and afternoon. Further details will be issued in due course.

Aluminium Brazing

Information Bulletin No. 22 published by the Aluminium Development Association, 33, Grosvenor Street, London, W.1, price 2s, describes the three main methods of brazing aluminium—flame (or torch), furnace and flux-dip—and deals with engineering practice rather than metallurgical principles. It is not intended to be a complete source of information on all working details of aluminium brazing techniques, but it gives sufficient data for readers to assess the processes in relation to a particular application; the ance equivalent to an extra 0·02in in joint design, can influence the design of the product.

A section of the bulletin describes the properties of brazed aluminium joints. Tests on brazed aluminium busbars have shown increased resistance equivalent to an extra 0·02in in a 24in length bar, which for practical purposes is negligible.

Cables for Malaya

More than 1,500,000 yd of aerial cable, one of the largest orders of its kind ever to be placed in this country by the Central Electricity Board of Malaya, has been fulfilled by Mersey Cable Works, Ltd. The cable has an aluminium core and is sheathed with p.v.c.

Austrian Electrical Industry

The development of the Austrian electrical industry is referred to by Mr. S. E. H. Daw (H.M. Counsellor (Commercial) and Consul-General at the British Embassy, Vienna) in his report on the economic and commercial conditions in Austria (H.M. Stationery Office, 4s 6d net). He says that the country is practically self-supporting in heavy electrical engineering and is able to produce large quantities of equipment for export. The value of production in 1955 of the main classes of equipment was as follows: — Motors and generators, 193·3 million schillings; transformers, 211·6 million; welding equipment, 29·7 million; h.v. switchgear, 100 million; radio apparatus, 255·2 million; radio valves, 35·8 million; telephone exchanges, 72·2 million; electric lamps, 102·8 million; lead-covered cable, 257·3 million; insulated wire, 94·8 million; and accumulators, 51·9 million. Of the above, exports in 1955 were as follows:—Motors and generators, 63·1 million schillings; transformers, 90·6 million; electronic valves, 15·1 million; radio apparatus, 23 million; measuring apparatus, 25 million; and lead-covered cable, 27·4 million. Imports of electrical machinery, apparatus and appliances in 1955 were valued at 752·6 million schillings. (£1=72·80 schillings.)

Institute of Marine Engineers

The Institute of Marine Engineers will take occupation of its office accommodation in the Memorial Building, 76, Mark Lane, London, E.C.3, from tomorrow (Saturday). The public rooms will not be ready for use until after the official opening of the building on 25th September by the Earl Mountbatten of Burma.

Girl Student Engineers

South Wales Switchgear, Ltd., which in conjunction with the Youth Employment Bureau has a scheme whereby grammar school students undertake one week's vacation training at the company's works at Blackwood, recently held an experimental course for fourth form grammar school girls, claimed to be the first of its kind in this country. The object of the course was to show the girls the possibilities of an engineering career. Thirty girls attended the course which proved to be a success. During the week they were shown the full range of a complex industry, extending from ratefixing and planning, material control, test, etc., in the factory, to the drawing office, designs, research and sales departments. Lectures were also given

Grammar school girls attending a vacation course at the works of South Wales Switchgear

by the company's executives on the various aspects and openings available in engineering.

Fluorescent Tube Guarantee

"Mazda" standard fluorescent tubes in the 15 W to 125 W range have been subject to a long life guarantee since June, 1953, and to remind purchasers of this all such "Mazda" tubes will in future carry a guarantee stamp. The guarantee applies to tubes failing within twelve months of purchase by the user, or before 3,000 hours' use, whichever is the shorter. Failed tubes will be replaced free.

Lamp Publicity

The Stella Lamp Co., Ltd., has produced two new lamp display items which are available to dealers on application to 158/160, Shaftesbury Avenue, London, W.C.2. One is a display screen for tungsten and fluorescent

A new lamp display piece being issued by the Stella Lamp Co., Ltd.

lamps. It is in bold colours and is suitable for window or showroom use. The centre panel is 30in high and 19in wide; the two side panels measure 30in by 10in. The other display is a collapsible counter showcard, specially designed to hold a tungsten lamp carton. A new and enlarged edition of the Stella catalogue of lamps and fittings is now available.

Crompton Parkinson, Ltd., commence their lamp sales publicity this month with a national advertising campaign, scheduled principally for both the Sunday Press and all four I.T.V. networks, and also with a comprehensive variety of reference literature and point-of-sale display material.

One of the Crompton lamp showcards available to stockists

The company's slogan, "Don't say 'Lamps'—say Crompton," which has been employed over the past three years, is being retained for the new campaign. This theme, based on the relationship of good lighting with good seeing conditions and symbolised by a bold presentation of a lamp and the human eye, is a feature of the complete campaign. It will be the dominant feature in Press advertising, television, of all the new literature, including catalogues, retailers' counter leaflets, price cards and pocket reference books, and also of the display material. Among this material, the main showcard is a bold, two plane design; a new and attractive 3-dimensional hanging "mobile"; and a new metal lamp dispenser, with adequate capacity for the popular sizes of lamp, which is suitable for standing on a counter or mounting on a wall.

There is also a new showcard for "Charmlight" lamps with a strong feminine appeal and, for car bulbs, there is new reference literature and a wall chart, as well as special advertising directed at motorists. Other advertising, additional to that already referred to, is to be directed at industrial lamp users. All literature and display material is available from branches and depots of Crompton Parkinson, Ltd.

Lamp Price Revisions

Atlas Lighting, Ltd., has announced that with effect from 5th September the price of "Atlas" 8ft 125 W bi-pin and b.c fluorescent tubes has been reduced from 25s to 20s. A similar announcement has been made by Ekco-Ensign Electric, Ltd., for its "Ekco" 8ft fluorescent tubes.

The company has also announced revisions, with effect from 2nd September, of the list prices of certain double-ended and single-ended tubular lamps, class B1/4 floodlighting lamps internally coloured, internally coloured sign lamps, and colour sprayed lamps. Details of the changes are available on request from the company at 233, Shaftesbury Avenue, London, W.C.2.

Export Licensing Branch

As from Monday next the address of the Export Licensing Branch of the Board of Trade will be Gavrelle House, 14, Bunhill Row, London, E.C.1 (telephone: Monarch 4071).

Marine Fan Agreement

A working arrangement is announced between Thermotank, Ltd., marine ventilating and air conditioning engineers, and Woods of Colchester, Ltd., fan manufacturers, under which the former company will discontinue the manufacture of certain classes of "Torpedo" axial flow fans which will be replaced by axial flow fans manufactured by Woods. It is intended that these fans, which will be known as Thermotank/Woods fans, will be distributed in the marine field by Thermotank. This agreement will result in combining the fan development resources of Woods and the consultative and design services of Thermotank.

New British Company in Canada

A new company jointly owned by the Phillips Electrical Co., Ltd., and British Insulated Callender's Construction Co., Ltd., has been formed at Brockville, Ontario, Canada, under the name of Phillips Electrical Construction Co., Ltd., with Mr. T. A. Lindsay as chairman and Mr. R. Betley as general manager. The new company will carry out construction work of a nature similar to that done by its British counterpart, including the installation of underground cables and overhead lines and the erection of bridges, masts and towers.

Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

ALUMINIUM ingots	ton £197 0s 0d
COPPER, H.C. Electro	ton £201 0s 0d
Fire Refined 99·70%	ton £200 0s 0d
Fire Refined 99·50%	ton £199 0s 0d
COPPER Tubes ..	lb 1s 11¾d
Sheet	ton £229 10s 0d
H.C. wire and strip ..	ton £252 15s 0d
LEAD, English ..	ton £90 5s 0d
Foreign	ton £89 0s 0d
MERCURY	flask £87 0s 0d
TIN, block (English) ..	ton £735 5s 0d
ZINC, G.O.B. Foreign	ton £73 5s 0d
Electrolytic	ton —
BRASS Tubes (solid drawn)	lb 1s 7¾d
Sheet	ton —
Wire	lb 2s 4¾d
PHOSPHOR BRONZE Wire	lb 3s 8¾d
PLATINUM	oz £31 0s 0d
RUBBER, No. 1 R.S.S. spot	lb 25¾d—26d

Guide to Nigeria

The third edition of the "Handbook of Commerce and Industry in Nigeria," published on behalf of the Federal Government of Nigeria by the Federal Department of Commerce and Industry, Lagos, has been completely revised to form an up-to-date guide to the developing Nigerian economy, and it has been specially designed as a reference book for business men and those considering investment in trade or industry in Nigeria. Particulars are given of the various Government Departments concerned with commerce and industry, public agencies and the more important private enterprises, public utilities, transport, shipping, telecommunications, overseas trade and commercial and industrial information. The publication is

obtainable from the Crown Agents for Oversea Governments and Administrations, 4, Millbank, London, S.W.1, price 11s post free.

Search for Uranium

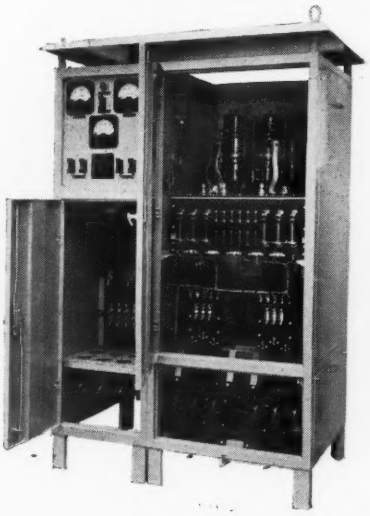
The United Kingdom Atomic Energy Authority has begun an aerial survey for radioactive minerals over 6,000 square miles of Southern Rhodesia. The survey is to encourage and assist prospectors in their search for uranium deposits. Maps will be published showing the places where strong radioactivity is detected. A thorough investigation of the chosen area is being made by a Hunting Geophysics, Ltd., aircraft carrying sensitive detecting equipment known as recording scintillation ratemeters. By flying this equipment at a height of 450ft the changes in the radioactivity from the ground below will be recorded. The aeroplane flies up and down in lines spaced at intervals of a quarter of a mile. When strong radioactivity is detected the position will be recorded by aerial photographs and later marked on a map. These maps will be published at intervals throughout the survey and will be displayed simultaneously in several public places.

By thoroughly examining the rocks within the interesting areas marked on the maps, a prospector may find deposits of uranium minerals. Some of these deposits may prove to be worth working and selling under the Authority's offer to buy uranium.

Mercury Arc Rectifier for Finnish Dock

Lancashire Dynamo Nevelin, Ltd., has recently supplied to Finland a mercury arc rectifier equipment to provide a d.c. supply for a floating dock. The set has an output of 69 kW, 300 A, 230/115 V, 3-wire, d.c. and the order was obtained against strong Continental competition. Because of the limited space available to house the equipment, the rectifier had to be as small as possible. This was achieved by using 100 A, single anode "Nevitron" tubes. The set was completed and dispatched within eight weeks from the time of ordering.

Lancashire Dynamo Nevelin mercury arc rectifier equipment supplied to a Finnish floating dock



Cable Handbook

A feature of a new handbook on paper insulated mains cables produced by the Telegraph Construction & Maintenance Co., Ltd., Mercury House, Theobald's Road, London, W.C.1, is that in addition to particulars of these cables it contains a copy of B.S. 48: Part I—"Impregnated Paper-insulated Cables for Electricity Supply" (lead or lead-alloy sheathed for working voltages up to 33 kV).

The handbook is prefaced by an illustrated account of the company's history, the materials employed and manufacturing and testing procedures. This is followed by much technical data and tabulated data of the various types of p.i. cables (1,100 to 11,000 V) made by the company.

E.C.A. Year Book

The 1957-58 edition of the "Electrical Contractors' Year Book" is now available from the Electrical Contractors' Association, 14, Bedford Row, London, W.C.1 (price 25s net, 27s 6d post free). It gives, as usual, alphabetical and "geographical" lists of members, particulars of the E.C.A. organisation and a great amount of matter of interest and use to electrical contractors—labour matters, legal and industrial information, the Electrical Fair Trading Policy, etc.

Glasgow Suburban Electrification

The British Transport Commission has announced that the work of erecting approximately 200 single-track-miles of overhead line equipment for stage 1 of the Glasgow suburban electrification on the 50 c/s system will be carried out by Pirelli-General Cable Works, Ltd. The electrification comprises the lines from Airdrie to Helensburgh and Balloch, and from Glasgow Central to Kirkhill and Neilston High including the Cathcart Circle, together with the lines from Motherwell to Kirkhill and Crossmyloof to Clarkston (part of stage 2 required for feeding stage 1). Installation work on the site will commence early in the New Year.

Southport Flower Show

Twelve giant tomato plants, between 18ft and 20ft in height, were exhibited at the recent Southport Flower Show. These plants, which were grown by electrical methods, have produced a total of 2 cwt 54 lb of fruit, an average of over 22½ lb per plant, although one of the plants actually bore 34 lb of tomatoes.

These plants were one of the principal attractions on the stand, organised jointly by the Electrical Development Association, the Merseyside & North Wales Electricity Board and the North Western Electricity Board. They were electrically propagated in the nurseries of three Lancashire commercial growers (R. & M. Hartley, Ltd., Thos. Ingle & Sons and John Ball & Son) and were taken in February to the North Western Electricity Board's experimental station at Kendal, where electrical treatment continued.

Tomato plants grown by electrical methods exhibited at the Southport Flower Show

Many other applications of electricity to commercial horticulture were shown on the stand. Among them was a system of electrical conveyors for rapid re-soiling for successive crops of winter and spring cress. Demonstrated in a 45ft by 22ft commercial greenhouse which formed the main part of the Stand, was a 7ft section of a mist propagation unit. In addition to these specific uses of electricity, there was on view a selection of labour saving aids to the grower such as compost shredders and mixers, pot washers, steriliser, soil block maker, and automatic bulb pasteuriser. Irrigation pumps having various duties about the holding were demonstrated.

Transistor Booklet

At the G.E.C. stand at the National Radio Show, visitors can obtain a free booklet on the transistor. This describes its development, its application and its advantages, and how it works.

Trade Announcements

Clang, Ltd., has appointed Mr. D. J. Cameron, 10, Gordon Road, Glasgow, S.4, as its area representative in Scotland and Ireland.

An additional exchange line has been connected at Swansea branch office of **British Insulated Callender's Cables, Ltd.,** and the telephone numbers now are Swansea 52094 and 54403.

Mr. G. E. L. Comrie, Scottish area engineer for **Holophane, Ltd.,** has changed his address to 34, Craigmount Avenue, North, Edinburgh, 12.

Nuclear Power Prospects

SIR CHRISTOPHER HINTON, F.R.S., managing director of the Industrial Group, United Kingdom Atomic Energy Authority, and now chairman of the new Central Electricity Generating Board, opened the Engineering, Marine, Welding and Nuclear Energy Exhibition, on 29th August. The exhibition, which remains open until 12th September, was reviewed in last week's *Electrical Review*.

In his opening address Sir Christopher said it was unlikely that a greater number of power stations would be needed by 1965 than the original twelve scheduled. It was proving to be possible to design reactors of considerably larger size than was initially envisaged so that the trebling of the size of the programme was unlikely to demand the construction of a materially greater number of power stations than was originally proposed.

By 1965 a very large proportion of the power stations built by the electricity authorities would be nuclear and it seemed to him to be quite impossible for the firms constituting the existing consortia to expect to fabricate and erect all the plant which was needed. While they might remain responsible for the design and construction of many nuclear power stations they would find it more and more necessary to buy items of plant from specialist and general engineering firms.

The Atomic Energy Authority was anxious to make widely available to British engineering firms the training necessary to render them capable of designing parts for nuclear power plants. In the overseas field, too, the existing consortia would not be able to meet all demands. Other countries would not purchase sections and components from us indefinitely if they were able to manufacture them themselves. We could, however, keep ahead of others by licensing designs and selling those specialised components which we were best equipped to supply.

T.U.C. at Blackpool

THE president, Sir Thomas Williamson, opened his address to the Trades Union Congress at Blackpool on Monday by asking the question "Are relations in industry getting worse?" While admitting that the total time lost this year would exceed that for any other year since 1926, he could not accept that this meant that relations in industry were worse and that industrial peace was in jeopardy. Since the war fewer industrial countries had a better record than Great Britain for peace in industry. A greater incidence of strikes in one year did not necessarily mean more industrial trouble the following year.

Peace in industry, Sir Thomas continued, was not a political issue. In a democracy trade unionists, like all other citizens, had political rights, but they could not and ought not to claim political privileges because they were trade unionists.

The right to strike was the final sanction of a free trade union, and must never be surrendered. But because withdrawal of labour was so serious a step, men should not be called upon to strike except under constitutional trade union authority, and only when all other methods of negotiation had been exhausted. "There is no virtue in striking when there is no real need to do so," Sir Thomas said. "Every dispute must end in a settlement, and we should do all we can to work for a solution before a stoppage takes place even though it may well call for the exercise of patience and forbearance often in the face of provocation."

But what of the responsibilities of the employers? They had had demonstrations enough this year from some sections on how not to conduct industrial relations. The serious stoppages in the engineering and shipbuilding industries were, he contended, provoked by the employers' deliberate disregard of normal democratic processes.

It was no credit to twentieth century civilisation that some employers still retained an outmoded scale of values. "I therefore submit to the employers of this country," Sir Thomas said, "that they must decide between autocracy and anarchy on the one hand and industrial democracy on the other. Autocratic behaviour provokes anarchy. We choose democracy through consultation and negotiation. They must do the same. There is an obligation on employers and trade unionists not only to accept joint consultation and negotiation but to do everything possible to make it work."

Sir Thomas saw the way to industrial peace through collective bargaining. The trade union movement had not lacked advice from outside on what its policy should be. There were plenty of people who had drawn up schemes of one sort or another. Most of them seemed based on the idea that the Government should estimate the amount by which the nation's wage bill could be safely increased each year, after which some as yet undiscovered wiseacre would decide on the merits of particular claims. Leaving aside the formidable difficulties of forecasting with any degree of accuracy the increased output likely to be available to meet wage demands, this idea seemed to imply that there was a fixed wages fund out of which claims could be met. Trade unionists could not accept this. Wages were only part of the picture. What of profits, salaries, interest—were all these things going to be planned as well? If they were, we should need a Solomon to decide how to share out the available money among wage and salary earners. How would the agreement of workers—and employers—to the new rates of pay be secured? The great merit of the British system of voluntary collective bargaining was that it gave the people most concerned a chance to work out their own rates of pay and conditions, and so commanded the allegiance of both sides. That was the best safeguard of industrial peace.

Sir Thomas was certain that our economic and social fortunes could not be left to the push and pull of market forces. And in no field was this more apparent than in investment. A high level of investment was needed, and needed in the right places. We needed machine tools more than pin tables and good roads more than road houses. If the Government accepted this pattern of priorities, it had done little to promote it. There were those who said that this meant a vast framework of controls. That was nonsense. Trade unionists did not want controls, whether of investment, building, imports, or prices, for their own sake, but only when it was in the interest of the whole nation to apply them. Nor did the unions want higher production and greater productivity for their own sake. They wanted these things because they would safeguard full employment and secure a higher standard of living.

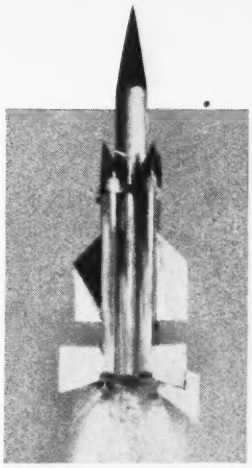
Public Lighting Conference

THE annual conference of the Association of Public Lighting Engineers is to be held at Torquay this year from 17th to 20th September. The conference will open on the Tuesday morning with an official welcome by the Mayor of Torquay which will be followed by the induction of the president, Mr. H Carpenter, M.I.E.E., F.I.E.S., who is to continue the presidency for another year owing to the illness of Mr. N. Axford, B.Sc., M.I.E.E. Mr. Carpenter will deliver his presidential address on the same day.

Other features of the conference on that day and during the rest of the week will be an exhibition of public lighting equipment and presentation of the following papers: "Beyond the Code of Practice," by Messrs. H. Hewitt and R. Stevens; "Relative Importance of Factors Affecting Street Lighting Performance," by Messrs. H. R. Ruff and G. K. Lambert; "The External Scene," by Messrs. C. R. Bicknell and J. T. Grundy; and "The Lighting of Bridges and Tunnels," by Messrs. J. M. Waldram and C. C. Smith.

The above are in addition to various social functions including the annual luncheon on Wednesday, 18th September, and the reception by Mr. and Mrs. Carpenter on 19th September.

Aircraft Electrical Equipment



SURVEY OF S.B.A.C. EXHIBITION AT FARNBOROUGH

THE flying display and exhibition of aeronautical equipment and instruments which is organised each year by the Society of British Aircraft Constructors (S.B.A.C.) is being held this week (2nd to 8th September) at the Royal Aircraft Establishment, Farnborough, Hants. As usual there is an impressive series of demonstrations of the latest types of civil and military aircraft, together with the now well-established "static" exhibition of aircraft engines, components, instruments and various other items relating to aeronautical engineering. Once again this display emphasises the increasing use and growing complexity of aircraft electrical apparatus, which, with the continued development of supersonic high altitude machines and guided missiles, has to be made to operate at the highest possible efficiency under extremely arduous conditions.

Air Data Computer System

Perhaps the greatest contribution which the electrical industry makes to aeronautical engineering is in the field of measurements and instrumentation. For instance, one of the main exhibits of Elliott Brothers (London), Ltd., is a fully automatic integrated air data computer system. This provides, from initial measurements of pressures and temperature in the airstream, a centralised source of aerodynamic data for various services in an aircraft. It replaces the more usual arrangement whereby all instruments and services obtain their initial information individually, and offers valuable economies in space and weight because of the reduction in the number of units and mechanical connections. Another interesting exhibit is a fuel flowmeter system which provides a continuous indication of the rate at which fuel is being consumed by an aircraft engine at any time, together with an indication of the total amount of fuel which has been consumed either by one engine or by all the engines in the aircraft.

Sangamo Weston, Ltd., are showing examples of their latest developments in the range of Weston aircraft instruments. The range includes instruments for the indication of temperatures, pressures, levels, control surface positions, turbine speeds, ice detection and electrical power. In addition, navigational aids and ground test sets are on view.

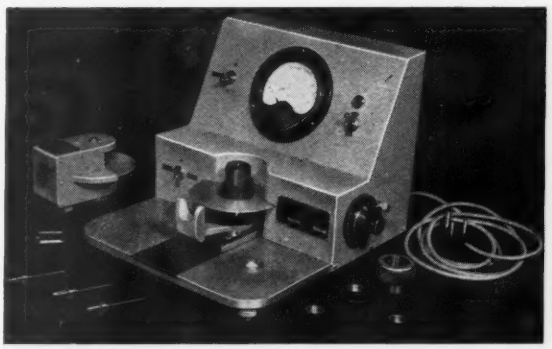
A company represented at the exhibition for the first time is Dawe Instruments, Ltd., who have a comprehensive display of electronic measuring instruments used daily in the aircraft industry. These include instruments for measuring engine vibration and sound level, dynamic balancing equipment for rotating components, electronic stroboscopes for rotary speed measurement and visual observation, and ultrasonic cleaning equipment for aircraft oil filters and other intricate components requiring extreme cleanliness.

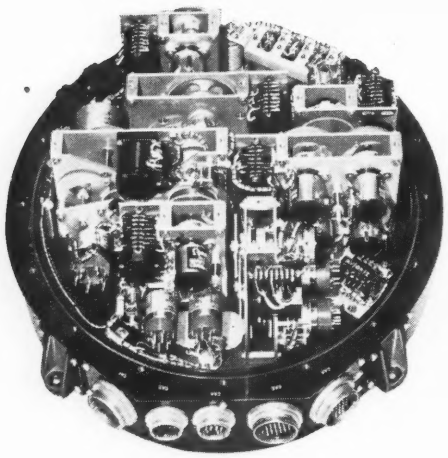
The increasing use of precision ball bearings in instrument and other applications has stressed the need for a simple and reliable checking device for determining "starting" or "breakaway" torque of a bearing. This should preferably be carried out under conditions of axial loading as such a test provides the most searching check on bearing accuracy, cleanliness and consistency of performance. An instrument for this purpose is shown by E. M. O. Instrumentation, Ltd. It comprises an electric drive unit arranged to apply a controllable torque to a light-alloy disc mounted on a drum. The bearing under test is mounted on the underside of the drum, the mass of the drum applying the required axial load to the outer race. In use the power input to the motor is gradually increased by rotation of the knob on the right-hand side of the instrument until the drum is observed just to commence rotation. The "starting" or "breakaway" torque in gm. cm. is then read directly from the meter. Observation may also be made of the minimum torque required to maintain continuous rotation.

Two new dynamometers are shown by Heenan & Froude, Ltd. One of these has a power absorption capacity of 350 h.p. and is being demonstrated with a friction brake for testing down to very low speeds. Other exhibits include a small water-cooled coupling for variable speed drives used in test rigs for aircraft accessories.

Amongst the comprehensive collection of electronic equipment shown by Southern Instruments, Ltd., the M977 double-beam oscilloscope is completely self-contained and incorporates built-in stabilised power supplies. A "20th Century" flat-faced 6in tube is used with two separate gun assemblies, enabling full use to be made of independent beam and plate controls without interaction. Separate

E.M.O. bearing friction testing machine





Elliott Bros. air data computer

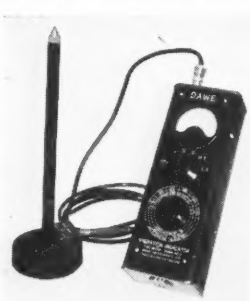
identical "Y" amplifiers for each beam make possible the direct comparison of waveforms. The gain is variable from 26 to 800 over a bandwidth from d.c. to 100 kc/s. The calibrated sweep time duration is from 100 μsec to 1,000 millisec with additional twenty times expansion on the "X" amplifiers. Synchronisation may be internal or external and, in addition, provision is made for operation from contacts on a machine or vibratory device and for beam triggering from the timing contacts on the M731 universal camera.

Rotor Blade Clearance Measurement

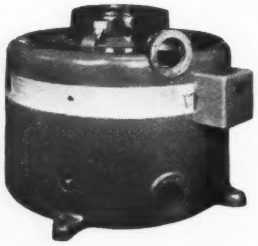
To achieve maximum efficiency in the operation of aircraft turbine engines it is essential that the clearance between the rotor blades and the outer casing be kept to a minimum and Wayne Kerr Laboratories, Ltd., in conjunction with Bristol Aero Engines, Ltd., have developed a small distance bridge to measure the increase in diameter of turbine rotors at working speeds. The equipment will measure changes as small as 0·0001in. The total increase in diameter may be of the order of 0·05in. The latest item shown on the stand of Goodmans Industries, Ltd., is the model V.G.109 vibration generator which has been especially developed for vibration testing of heavy units over a wide frequency range. The vibrator installed with a 20 kVA amplifier is capable of producing continuous forces of 8,000 lb at 500 c/s. Conversely, forces in excess of 6,000 lb can be generated with 10 kV applied and over 2,000 lb with only 1 kVA.

A mains-operated power unit specifically designed for supplying dekatron counting systems is demonstrated by Denis Ferranti Meters, Ltd. It has eleven individually stabilised outputs, three of which are continuously variable. Other exhibits include epoxy resin encapsulated components of exceptionally high quality and the "ear guard" protective unit for use by people working in close proximity to jet engines where the noise level is dangerously high. The telemetry receiving system on the stand of McMichael Radio, Ltd., receives data signals from guided missiles in flight and records them photographically on ciné film. These signals are then applied to either a histogram receiver or a multi-tube recorder, or to both. Timing and/or firing signals can be fed into both the histogram and the multi-tube recorders. The receiving equipment incorporates its own test gear to the extent of a monitor cathode-ray tube, a signal-strength pen recorder, a u.h.f. signal generator and a test signal generator simulating the sub-carrier signals.

Dawe type 1414 vibration indicator



Goodmans Industries V.G. 109 vibration generator

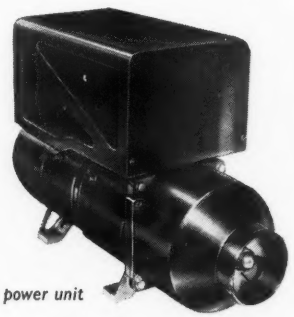


Testing Gyroscopic Instruments

The Mark 4A gyro test table made by Bryans Aeroquipment, Ltd., simulates all the flight motions specified for testing gyroscopic aircraft instruments. Air and electrical instruments can be tested in the combined motions of roll, pitch and yaw, and in continuous turns in azimuth, and these motions are reversible by automatic or hand control. In conjunction with the above company the Royal Aircraft Establishment, Kelvin & Hughes, Ltd., and S. G. Brown, Ltd., are demonstrating a fully operating model of their master reference gyro type A.5. This equipment is still the only master reference gyro for aircraft in production and being installed in military aircraft in the world.

The design of aircraft flight instruments has followed a standard pattern for many years, but recent developments of high performance aircraft have exposed many limitations and necessitated a new approach to the problem of the presentation of flight and navigation data. Kelvin & Hughes, Ltd., in close collaboration with the Ministry of Supply, the Royal Aircraft Establishment and the Institute of Aviation Medicine, have now developed an instrument system which integrates the flight dynamic and aerodynamic information on a comprehensive display. The display units are servo operated and respond to data received from separate sensing, detector and computer units, to give accurate and unambiguous information to the pilot.

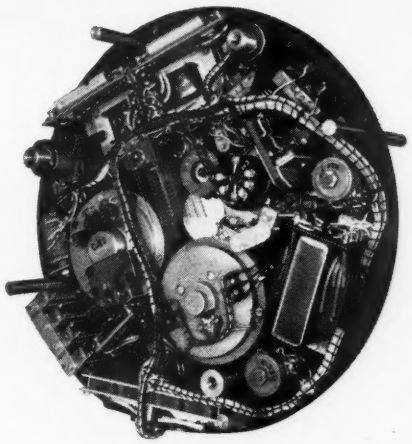
Vactric size 11 servo-motor



Denis Ferranti dekatron power unit

Vactric (Control Equipment), Ltd., having established the design of the size 11 a.c. servo-motor and proved it in production have now developed a whole range of size 11 a.c. components which includes servo-motors, damped servo-motors, motor-generators, tacho-generators, synchronous motors and magnetically braked versions. In addition, to cover the whole field of servo-mechanism power requirements from merely moving an aircraft panel instrument pointer to actuating heavy fuel valves, the company is this year introducing a new series of frame size components. These range from the $\frac{3}{8}$in diameter size 07, through the 10, 11 and 15 to the comparatively large $1\frac{3}{4}$in diameter size 18.

One of the main features of the G.E.C. stand is an animated diorama model of an aircraft carrier equipped with a working model of the deck-landing mirror sight, for which G.E.C. has designed and supplied the special lighting equipment. Full-scale examples of the source light, datum light, and wave-off light are shown beside the model of the carrier. Exhibits of airport lighting equipment include a new low intensity approach light. In a display of aircraft catering equipment is the galley of the Bristol Britannia, a new version of the 1·6 gal capacity hot food container, an air circulation



S. G. Brown master reference gyro

oven, and a new type of hot-cup unit using a sheathed-wire element instead of mica as formerly.

Salford Electrical Instruments, Ltd., are showing for the first time a comprehensive range of "Klixon" aircraft circuit-breakers, as well as a complete range of quartz crystal units, and a standardised range of precision potentiometers in metal housings. A medium-power mobile germanium rectifier equipment is shown working, together with the S.E.I. transducer system for remote electrical measurement of pressures, temperatures and mechanical movements. The Applied Electronics Laboratories of the G.E.C. are showing a number of items developed in the course of work on missile guidance systems and radar projects. These include examples of the construction of intricate waveguide circuits by a novel, simplified technique, and units from a large general purpose analogue computer, STARDAC, which was first brought into being to solve the complex equations of guided missile flight.

As usual Western Manufacturing (Reading), Ltd., are exhibiting a wide range of aircraft accessories such as actuators, switches and fractional h.p. motors, but there is a newcomer to the stand in the shape of a dynamic test rig for the automatic inspection of piece parts and sub-assemblies. The parts can be extracted from a magazine and subjected to multiple dimensional checks on the rig. They can be sorted into "go" and "no go" categories, and defects segregated if required, into different bins, either for scrap or for rectification. In addition, automatic inspection can be linked directly to an automatic production machine and, if it is considered warrantable, an error signal can be used to control a servo-motor which will adjust the production machine to rectify the error.

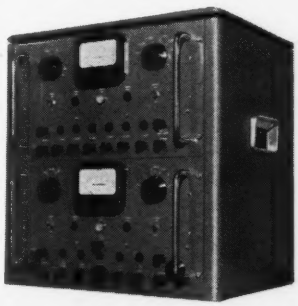
High Power-to-Weight Ratio Invertor

A new type of invertor for use in the Vanguard civil aircraft ordered by B.E.A. is shown by the Plessey Co., Ltd. These are believed to be unique in this country, because of their extremely high power-to-weight ratio. Each unit weighs less than 60 lb and overall dimensions including the control panel mounted integrally with the invertor, are 19½in long, 7$\frac{1}{16}$in wide and 11$\frac{7}{8}$in high. From a d.c. input supply which may vary between 25 and 29 V, the invertor provides a three-phase output of 3 kVA, 200 V, 400 c/s at any power factor between 0·8 lagging and 0·95 leading for use in instruments, radar, and allied equipment. The invertor is self-cooled up to 10,000 ft, and is capable of operating on full load in ambient temperatures between −30 to +45 deg C. Under all these conditions the output voltage is held to a tolerance of ±2½ per cent of 200 V and the frequency to ±3 per cent of 400 c/s.

Apart from relays, d.c. motors, high-speed cameras and turn and slip indicators R. B. Pullin & Co., Ltd., have a range of 400 c/s servo components including synchros, servo-motors and motor-tachos, all housed in international standard housings. There is also a working demonstration of motor-tachos in conjunction with synchros, magnetic and transistor amplifiers of British manufacture. On the stand of Ferranti, Ltd., is a graphic display of the "Bloodhound" guided missile chasing its moving target. Since 1949 the company has collaborated with Bristol Aircraft, Ltd., in the development of guided weapons for the air defence of Great Britain. The outcome is the "Bloodhound," a surface-to-air guided missile which, combined with early warning information from long-range tactical control radar stations, forms a complete defence system. Ferranti are responsible for the radar and electronic equipment and associated mechanisms which guide and control the missile on to its moving target. Several components used in "Bloodhound" are on view together with examples of printed circuits, accelerometers, artificial horizons, silicon junction diodes and rectifiers, and computers.

The British Thomson-Houston Co., Ltd., is exhibiting an extensive range of aircraft components, including turbo-starters, high-energy ignition units, booster coils, a.c. and d.c. motors and generators, switches and contactors, magnetos, and "Mazda" lamps and lighting equipment, all of which are being supplied in quantity for a variety of aircraft in service throughout the world. Of special interest is a range of silicon rectifiers and reference diodes shown for the first time. Because of their ability to operate at 200 and 250 deg C respectively these are finding many applications in aircraft.

Other exhibits include typical examples of a.c. and d.c. motors from a wide range specially designed for operating in aircraft under every condition of service. Among these are some very small induction motors of the type used in radar servo-control circuits, and small blower units. Large motors for flying control systems and similar ancillary equipment are also on view. In an allied field the electrical exhibits displayed by Electro-Hydraulics, Ltd., include electro-hydraulic solenoid operated valves from the standard ranges developed and manufactured by the company, and, additionally, solenoid valves designed specifically for guided



Plessey 3 kVA invertor

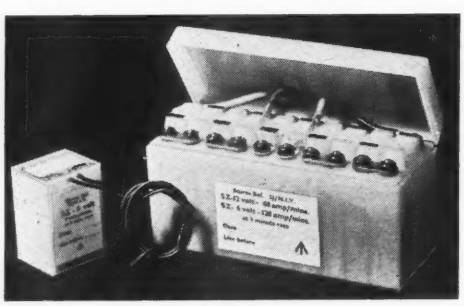
Ferranti miniature artificial horizon and control/invertor

weapons. A very wide range of aircraft electrical equipment is shown by Rotax, Ltd., and this embraces power generating systems of all types, starting systems, actuators, invertors, switchgear, motors and de-icing equipment.

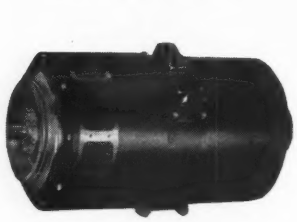
Among the items shown by Smiths Aircraft Instruments, Ltd., is a range of 400 c/s motors including hysteresis, drag-cup, and squirrel-cage machines in sizes between $\frac{3}{8}$in and $2\frac{1}{4}$in diameter. The latest design is a two-phase squirrel-cage induction motor which has an overall diameter of $\frac{5}{8}$in. It can be supplied with a centre-tapped control winding so that it can be driven by a pair of transistors without the necessity of an output transformer. On an adjoining stand Kelvin & Hughes (Aviation), Ltd., are demonstrating their audio incidence system which has been developed in collaboration with the Ministry of Supply from the air speed sensing unit. It provides a pilot with an audio tone pattern related to the correct landing approach conditions. There is also a visual presentation which is diagrammatic of the aural pattern with additional markings corresponding to degrees incidence against aural presentation.

The multi-channel recording equipment shown by Thermionic Products, Ltd., provides invaluable facilities for airport operation. The equipment is adaptable to several functional arrangements to suit conditions and requirements, but basically is capable of maintaining continuous "listening watch" and recording up to 14 simultaneous transmissions on a single magnetic tape, 0·7in wide. A facsimile weather chart transmitter and recorder is shown in operation by Muirhead & Co., Ltd. The instruments demonstrated are of the type used on the Canadian weather facsimile system which is the first fully automatic network in the world. Also on show is a complete range of Muirhead synchros and servo-motors and the D-489 Muirhead-Pametrada wave analyser and its associated equipment. A similar but lower priced instrument is the type D-788 frequency analyser, which is designed for low-frequency vibration and noise analysis applications where the greater discrimination offered by the D-489 is not required.

In addition to its P.1B supersonic fighters and Canberra Mark 8 bomber the English Electric Co., Ltd., is displaying a full-size "Thunderbird" ground-to-air missile which is in production for the Army. New items of electrical equipment for aircraft and guided missiles include a 400 A generator with a 3:1 speed range, an improved d.c. starter generator, miniature rotary and linear actuators, and a 750 VA 3in alternator weighing 3 lb 10 oz. There are also a.c. and d.c. submersible fuel pump motors and a selection of d.c. and a.c. rotating machines, universal actuators, control gear and constant speed drives.

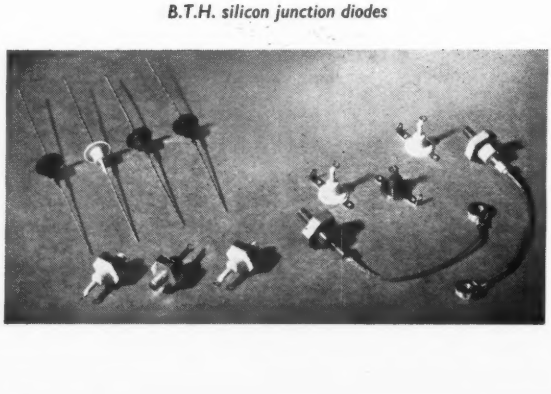


Venner lightweight silver-zinc accumulators for use in guided weapons



Rotax 80 kVA constant frequency alternator

B.T.H. silicon junction diodes



Accumulators for Guided Missiles

Lightweight silver-zinc accumulators, which are incorporated in power units of guided missiles for telemetering and development work, are shown by Venner Accumulators, Ltd., while Chloride Batteries, Ltd., are exhibiting new "Drydex" batteries for transistorised equipment. They include the "Drydex" leakproof unit cell type T21 and a series of layer-built batteries of the "Drymax" type, which are produced in varying shapes, sizes and capacities for both airborne and ground electronic equipment. Peto & Radford have a new 24 V 13 VA aircraft battery, which is fitted as initial equipment on the Viscount 800 series aircraft and can be used as a replacement for the Viscount 700 series.

The principal exhibit of the Westinghouse Brake & Signal Co., Ltd., illustrates the main features of the four types of rectifiers manufactured by the company—copper, selenium, germanium and silicon. The comprehensive array of rectifiers on view includes lightweight blast-cooled rectifiers for main d.c. power supplies in aircraft, high-temperature aluminium-based rectifiers, and miniature units for electronic circuits. Selenium and silicon rectifiers are also shown by Standard Telephones & Cables, Ltd., as well as a wide range of aircraft electrical components and airborne radio and navigational equipment. Rectifier sets, transformers, engine starters and battery chargers are shown by Partridge, Wilson & Co., Ltd., and aircraft ground power units for starting and servicing all types of aircraft by Murex Welding Processes, Ltd.

Welding equipment is being shown by both Philips Electrical, Ltd., and Sciaky Electric Welding Machines, Ltd. Belling & Lee, Ltd., are exhibiting a selection of aircraft fuses, fuse-holders, and general electronic components.

A wide range of insulating materials is being shown by Bakelite, Ltd., I.C.I., Ltd., and Ashdowns, Ltd., while Tufnol, Ltd., is illustrating some of the many applications for which the well-known material it manufactures is suitable. Cables of all types for the aircraft industry are being shown by British Insulated Callender's Cables, Ltd., W. T. Henley's Telegraph Works Co., Ltd., and the Telegraph Construction & Maintenance Co., Ltd.

Radio-Isotopes in Scientific Research

AN international conference on radio-isotopes in scientific research, convened by U.N.E.S.C.O., is to be held in Paris from 9th to 20th September. The inaugural session will be held in the Grand Amphitheatre of the Sorbonne. Subsequent sessions will take place in the building of the Ecole de Medecine, rue des Sts. Peres, Paris. Sir John Cockcroft will preside over the conference, the main purpose of which will be the exposition and discussion of new ideas and methods for the use of radio-isotopes in biology, physiology, agriculture, medicine, oceanography, and industrial research.

Sweden's Electrical Trade

ELECTRICAL imports into Sweden rose in value last year by 11 per cent to £32·3 million, and exports by 10·5 per cent to £25·2 million. Sweden is not only a formidable competitor but also a desirable market, as shown in Tables 1 and 2 (£1=14·4 kr).

Although Western Germany and Holland re-entered the Swedish market most successfully, Sweden remains one of the United Kingdom's leading European customers. Among the factors contributing to our favourable position are the complementary economies of the two countries and the long-standing goodwill for British products. Some of the more important United Kingdom electrical exports to Sweden last year are listed in Table 3. As in previous years, electronic equipment took the lead, followed by fractional h.p. motors and domestic appliances.

Sweden as an electrical exporter during last year gained ground not only in her traditional European markets but also very considerably in India and South Africa. Her export success is based on a sound home market, competitive prices, attractive delivery terms and extended credits, coupled with a vigorous sales approach.

Forecasts prepared by the Swedish Joint Hydro-Electric Power Board indicate that a total annual increase in consumption of electricity of about 1,700 million kWh is to be expected during the period 1954-61. This represents an increase of 6·2 per cent per year and is considerably greater than the previous forecast made in 1950. This official forecast is conservative and it may prove that an annual increase of 9 per cent will be nearer to the mark.

TABLE 1.—SWEDISH IMPORTS AND EXPORTS
(million kr.)

Country	Imports		Exports	
	1956	1955	1956	1955
United Kingdom ...	67·6	61·5	13·4	9·6
Norway	7·4	6·5	30·0	34·5
Denmark	23·9	23·2	20·9	25·7
Finland	0·4	0·4	28·6	19·1
Poland	1·4	1·2	7·0	11·1
Russia	—	—	4·0	5·7
East Germany ...	1·4	0·5	0·1	0·1
Western Germany ...	206·1	189·9	10·4	9·8
Holland	63·8	57·8	17·4	15·5
Belgium	5·3	7·1	6·4	7·2
France	9·4	6·9	8·7	7·1
Spain	—	—	3·7	9·9
Portugal	—	—	4·7	3·0
Italy	2·5	1·9	9·3	8·7
Switzerland	13·9	15·2	5·2	4·6
Austria	4·2	3·1	4·7	4·9
Jugoslavia	—	—	8·2	1·5
Turkey	—	—	4·3	8·2
S. Africa	—	—	5·8	4·4
India	—	—	11·0	5·9
Pakistan	—	—	1·0	2·0
Egypt	—	—	11·6	10·2
S. Arabia... ...	—	—	3·1	5·0
Canada	n.a.	1·5	n.a.	7·0
United States	n.a.	38·5	n.a.	6·1
Australia	—	—	3·9	4·4
New Zealand	—	—	2·9	3·4
Total (including other countries)	465·0	420·7	363·0	331·1

n.a., not available.

TABLE 2.—PRINCIPAL PRODUCTS
(million kr.)

Group	Imports		Exports	
	1956	1955	1956	1955
Generators, motors, and other elec. machinery n.e.s., incl. transformers	67·6	55·3	62·4	57·9
Fans, vacuum cleaners, floor polishers and other electro-mechanical appliances ...	48·4	46·9	49·4	47·6
Stators, rotors, collectors, electro-magnetic coils, etc. ...	11·6	10·0	1·8	2·1
Accumulators	3·6	3·2	15·0	14·9
Galvanic elements	4·4	4·1	—	—
Lamps, lanterns	27·8	27·3	4·5	3·3
Carbons for elec. purposes ...	18·2	15·6	1·2	0·5
Safety and regulating apparatus...	34·9	30·5	30·4	21·5
Porcelain insulators	3·4	4·2	—	—
Cables, metal sheathed	30·0	31·4	19·6	13·1
Ditto, others	20·2	20·0		
Heating appliances	5·6	4·8	3·4	3·5
Telephone and telegraph apparatus	6·4	5·3	137·2	99·9
Radio apparatus and parts, including valves	88·9	55·8	20·2	13·8
X-ray tubes ...	2·7	2·6	0·9	0·8
Electro-medical apparatus and special electro-technical apparatus	118·5	90·6	47·0	42·8
Other equipment and apparatus	12·8	11·6	4·8	5·0

TABLE 3.—UNITED KINGDOM'S ELECTRICAL EXPORTS TO SWEDEN (000 £)

Group	1956	1955
Diesel generating sets	59	40
Steam turbo sets	—	10
Generators and parts	11	14
Motors, under 1 h.p.	372	385
Ditto, 1–250 h.p.	44	29
Ditto, over 250 h.p.	6	2
Motor parts	26	25
Convertors, rotating	1	3
Transformers	63	46
Switchgear and switchboards	18	11
Mercury arc rectifiers	1	13
Welding plant and electrodes	24	20
Electro-medical apparatus	19	21
X-ray apparatus	6	9
Hearing aids	2	4
Cookers	—	2
Space heaters	31	39
Parts of heating appliances	128	142
Flat irons	88	39
Vacuum cleaners	45	14
Floor polishers	—	2
Hair clippers and dry shavers...	198	123
Fans	9	17
Washing machines up to 150 lb	275	358
Ditto, 150–250 lb	17	5
House service meters	7	6
Commercial instruments	54	64
Scientific instruments	169	149
Valves, electronic, radio, TV, radar, and sound reproducing apparatus	978	1,117

Australian News

The sales replacement principle of import licensing came into operation as from 2nd August, but it cannot be fully implemented immediately as it will take time for established and new importers to show their ability to sell in the competitive situation which will exist when imports reach a level which will meet all current demands.

Items now to be licensed on a sales replacement basis include: Portable electric hand tools, parts for air-conditioning and refrigerating machinery, and engines. Transferred from administrative to quota control are: parts and materials for the manufacture of batteries, parts and materials for the manufacture of filament and fluorescent lamps, train lighting equipment and train air-conditioning equipment.

The N.S.W. Electricity Commission is to build a £56 million power station in the southern Lake Macquarie area. The Minister for Local Government, Mr. J. B. Renshaw, who announced this, said the station would be one of two which the Commission would build on the northern coalfields. The first unit would need to be in operation by 1963. When completed, the station would have a capacity of 800 MW. The second power station, which would have the same capacity, would be built on a site somewhere between Singleton and Newcastle.

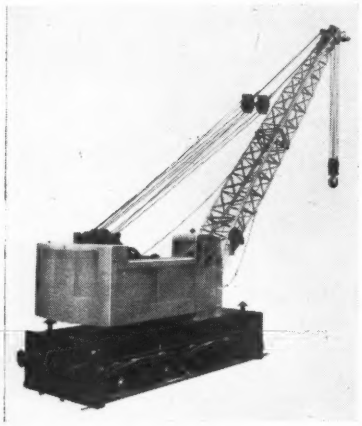
The State Cabinet of New South Wales has approved the draft agreement for the use of water and power from the Snowy Mountains hydro-electric scheme. The Premier, Mr. Cahill, said that a separate agreement was necessary between the Snowy Mountains Authority and the N.S.W. Electricity Commission on the purchase of power from the Guthega project, which is part of the broad scheme.

NEW ELECTRICAL EQUIPMENT

Rail Crane

The latest and largest addition to the Coles range of cranes is the rail-mounted R5010 "Samson" model. Designed, manufactured and marketed by STEELS ENGINEERING PRODUCTS, LTD., Sunderland, this crane is able to lift 45 tons at a radius of 12ft when fitted with a 50ft centre jib. The power plant consists of a 100 h.p. diesel prime mover driving a shunt-wound generator, which supplies current to separate motors for each of the four crane motions—hoist, derrick, slew, and travel. One advantage of the transmission system is the resulting reduction in fuel consumption since the engine is not kept running at constant high speeds. Should the electricity supply be interrupted electro-mechanical brakes are automatically applied.

The operator's cab has conveniently grouped finger-tip controls to give fatigue-free operation over prolonged



Model R5010 "Samson" rail crane

periods. Control is effected by one lever for each motion, which makes the electrical connection for both directions of any motion. The standard jib can be extended to 80ft by the use of extension pieces. For cranes with twin hoisting drums a 25ft fly-jib may be used as a straight extension or swan-neck with a maximum offset of 6ft from the centre line of the main jib. When fitted with standard jib, the R5010 weighs approximately 84 tons and has a shunting capacity of 400 tons when working on a straight level track.

When required, an electromagnet of up to 50in diameter may be fitted and for grabbing duties an assortment of grabs are available with a maximum capacity of 45/36 cu ft, a spring-loaded tag-line being provided for extra control. A radius indicator shows at a glance the safe working load for the jib radius and any tendency to overload is immediately corrected by the Coles B & A safe load indicator, a fully automatic safety device with both visual and audible warning signals.

Totally enclosed self-resetting limit switches provide an automatic safeguard against overwinding, overlowering and derricking beyond the prescribed limits.

Capacitance Monitor

Series K capacitance gauging systems, which have been designed to monitor continuously and maintain constant automatically the capacitance of insulated conductors, have recently been introduced by the ADDISON ELECTRIC CO., LTD., 10-12, Bosworth Road, London, W.10. Their main application is to the control of wall thickness of cellular or foamed plastics, and that of telephone and high frequency cables whose specifications call for constant capacitance rather than constant diameter. A further application is to the automatic control of average wall thickness in the extrusion of jackets over metal sheaths, particularly where these sheaths are not circular in section or are of varying diameter, and where as a result the maintenance of constant wall thickness is rendered difficult.

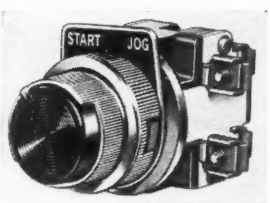
These capacitance gauging systems form part of the unitised range of Addison size and eccentricity control equipments. They may be used as monitors only, or in conjunction with the automatic control unit. In either event, the standard strip chart recorder unit can be added.

The equipment is easy to install and to use and by means of two gauge heads it covers the range 0-3½in (90 mm) overall diameter, with a precision of ½ per cent of the total capacitance, independent of extrusion speed. Direct visual tolerance presetting and cable speed controlled correction rate, greatly facilitate the operator's task. The equipment can be operated on a statistical basis, and a further feature is the ease of servicing achieved by logical unitisation.

Telecommunication Control Unit

Selector push-button operators that perform the dual function of selector switch and push-button have been

Square D selector push-button operator



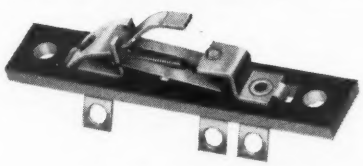
added to the range of control station equipment manufactured by SQUARE D, LTD., 100, Aldersgate Street, London, E.C.1.

The new device, which has a positive action, incorporates a half guard with a cam attached that can be moved to the required position shown on a legend plate. It can be used with standard single pole, double throw and double pole, double throw contact blocks and a wide variety of legend plates.

Snap-Action Switch

A new sensitive snap-action switch which has been designed for building into equipment such as calculating machines, coin operated machines, process timers, etc., has recently been introduced by ARCOLECTRIC (SWITCHES), LTD., Central Avenue, West Molesey, Surrey.

The skeleton switch, having contacts of fine silver, is designed on the micro gap principle, occupying less space and



Arcolectric snap-action switch

costing less than conventional switches. Rated at 3 A, 250 V a.c. only, the life expectation is 1½ million operations. Single-pole changeover switching returns to normal when pressure is released.

Non-Metallic Heating Element

An area-heating element embodying new principles and manufacturing technique has been developed by A. J. KEMP, SONS & CO., Harlow, in collaboration with Hunting Percival Aircraft, Ltd. "Mhoglas," as the element is called, has—within its own operational field—many advantages over conventional elements. These may be summarised as follows:—It is light, flexible, non-metallic and made in thin sheet; may be shaped, cut and formed, potted, laminated and incorporated in wood, plastic, "Formica," rubber, concrete or metal; can suffer local damage without causing element failure (this facility also makes it "safe"); provides even "solid" heating without hot spots or tracks and can then be embedded in plastics; may be curved to radii of 1½in, or as low as ¼in during manufacture; and can be controlled, directly or indirectly, by thermostat. At present the element is made in widths up to 12in and lengths up to 4ft.

While in no way a direct substitute

for the conventional element, the new product has many obvious applications which include space heating of buildings with floor, wall or skirting board installations or building into wooden, plastic or rubber panels; food warming equipment; supplying heat to the human body—sheet elements could be embodied in the surfaces of operating theatre tables for example; photographic processing involving temperature control, the heating being supplied either by built-in elements or by separate elements suspended in the tanks or simply laid flat; maintaining liquid temperature at above freezing point temperatures—the electrolyte of aircraft batteries for example; and show-window de-frosting.

Fire Escape Communication System

A loudspeaking communication system supplied by EASCO ELECTRICAL (HOLDINGS), LTD., Brighton Terrace, London, S.W.9, is incorporated in a new hydraulic turntable ladder fire escape recently introduced by Merryweather & Son, Ltd. The system comprises a transistor amplifier and two micro-loudspeakers, one of which is fitted into the control panel at the base of the fire escape, and the other into the side of the escape at the top.

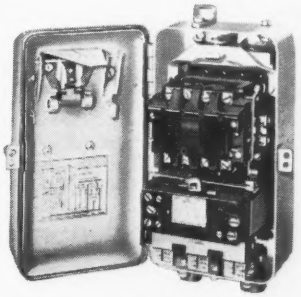
The micro-loudspeakers are switched on at the control panel and the circuit actuated by a push-button. This enables the operator at the base of the escape to talk to the fireman at the top. The button is released to enable the latter to reply. If he himself wishes to draw the attention of the operator a button on the ladder enables him to set off a buzzer on the control panel.

Easco micro-loudspeaker fitted into control panel at the base of fire escape

The system incorporates a transistor amplifier and has a power output of 5 W. Of the three units, two are in waterproof aluminium alloy cases. They can be fitted, if required, with shock absorber mountings. Operation is direct from the vehicle battery at 6, 12 or 24 V.

"Plug-in" Starter

A recent development by BROOKHIRST SWITCHGEAR, LTD., Chester, is the type 616 "plug-in" starter designed for use with three-phase squirrel cage motors up to 7½ h.p., 500 V, 25/60 c/s which is eminently suitable for use in applications where continuous running is essential. The complete interior may be removed and a replacement fitted within half a minute. This is achieved by mounting the front-connected contactor and overload relay on a moulded panel having incoming and outgoing main and auxiliary plugs secured to its underside. The latter make circuit with spring-loaded fixed contacts mounted in mouldings inside the starter case.



Brookhirst "plug-in" starter

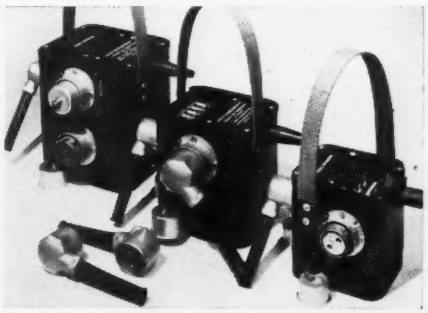
The main panel moulding pivots in projections on the bottom outgoing fixed contact moulding and is held off its top fixed incoming contacts by means of a compression spring. When the isolator lever is moved to the "on" position, cam rollers on the lever press the main panel back against the action of the compression spring to make circuit between the top fixed and moving contacts which function as an isolator.

The contactor incorporated is a triple-pole "block" type model conforming to B.S. 587/1940 and B.S. 775/1956. It has quick-release, double-break, sintered alloy moving contacts and provides inherent undervoltage protection. Thermal or solenoid type overload relays are available and control is effected by integral "start" and "stop" push-buttons, provision being made for remote control.

Transformers for Portable Tools

Cast-in-resin transformers especially designed for use with portable tools are now being produced by FOSTER TRANSFORMERS, LTD., South Wimbledon, London, S.W.19.

The transformers are cast in polyester resin and fitted with a webbing carrying strap. Two recesses are cast in the top of each unit, one containing the primary tapping terminals and the other the secondary fuses made to comply with B.S. 1362 and mounted in robust clips. A spare fuse is provided. Each recess is fitted with a gasketed cover upon which is engraved the requisite identification.



Foster cast-in-resin transformer

A combined rubber bush and tapered sleeve entry accommodates different sizes of three-core primary cable. Secondary connections are to output sockets on the sides of the unit, each being separately fused on both poles.

The details and prices are as follows: Type CRL.150, 150 VA, 25 V m.p.e., price £12 6s; type CRTL.500, 500 VA, 110 V m.p.e. tapped at 25 V m.p.e., price £15 15s; and type CRTL.1000, 1,000 VA, 110 V m.p.e. tapped at 25 V m.p.e., price £23 7s 3d. Tappings are provided on the input side for 200/210 V, 220/230 V and 240/250 V.

Irradiated Polythene Cables

BRITISH INSULATED CALLENDER'S CABLES, LTD., 21, Bloomsbury Street, London, W.C.1, has recently announced the manufacture of a selected number of types of small coaxial radio frequency cables insulated with irradiated polythene. The polythene insulation is irradiated so as to reduce greatly deformation of the core during soldering, but otherwise these cables are of a standard construction. Although the power factor is slightly increased, other electrical characteristics are virtually unimpaired, and the cables are recommended for normal r.f. applications at up to 200 Mc/s.

In addition, irradiated polythene equipment wires with improved soldering properties are now available together with a similar type of wire which is also satisfactory for continuous operation up to 100 deg C. The latter type may also be operated at 120 deg C for 1,500 hours and for shorter periods (approximately 1 hour) up to 250 deg C, provided that care is taken to ensure that the insulation is not placed in contact with bare copper.

DOMESTIC ELECTRICAL EQUIPMENT

Electric Cookers

IN this survey we deal with an appliance which is perhaps the most important contribution to the all-electric home—the electric cooker. Apart from the inevitable price increase (approximately 7½ per cent on most makes) there have been few changes either in shape or style during the past twelve months; basically they remain unaltered.

Colour, however, is more in evidence, particularly on cooker parts. The latest Tricity model, "Tricity Viscount," has interchangeable control panels in various colours, while the B.N.E. "Britannia" range is now available in new ivory, cream or white with black hob and cream or red handles. Aquamarine or lavender hobs are alternatives to the standard white and cream for the English Electric raised-oven cooker and the Simplex Electric Co. announces turquoise, blue or green finishes for the "Creda" range of cookers.

For those who consider that three hotplates on a cooker are at times insufficient there is the news of a new model from Falco Electrical Appliances, the "Falco Royal" Mark IV, which is fitted with four plates all of which are of the radiant type. All Jackson cookers are now equipped with the company's new "Speedring" plates with respective loadings of 2 kW (8in) and 1,350 W (6¼in), but in most other makes the loadings of the plates are standardised at 1,800 W and 1 kW respectively. Radiant type plates with the increased loadings, mounted on E.D.A. plug-in cradles, are, however, obtainable from the Hotpoint Electric Appliance Co., the General Electric Co. and the Metropolitan-Vickers Electrical Co.

Oven control is almost without exception thermostatic and nearly all cookers to-day are either automatically controlled or can be adapted for conversion by fitting an automatic control panel.

Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
BELLING & CO., LTD., Southbury Road, Enfield, Middlesex.	64AB Streamline	Vertical	37×23½×23	Removable (one-piece)	16×15×13	3,400 W	—	Thermostatic
	47AB	Vertical	36×21×21	Removable (one-piece)	13×13×16	2,500 W	—	Thermostatic
	45A "Baby Belling"	"Baby"	21×18×15½	Fixed	11½×13×13	1,200 W	—	Three heat
	51 "Wee Baby Belling"	"Baby"	12×13¾×11½	Fixed	9¼×9×9¼	600 W	—	Three heat
	53 "Big Baby Belling"	Stand or cabinet	36×21×16	Fixed	11½×11½×11½	1,000 W	—	Three heat
	29	Table	9×16½×12	—	—	—	—	—
	"53-Plus"	Stand or cabinet	36×21×16	Fixed	11½×11½×11½	1,000 W	—	Thermostatic
	"47T"	Vertical	36×21×21	Removable (one-piece)	13×13×16	2,500 W	—	Thermostatic
	"47-Plus"	Vertical	36×21×21	Removable (one-piece)	13×13×16	2,500 W	—	Thermostatic
	"64-Plus"	Vertical	37×23½×23	Removable (one-piece)	16×15×13	3,400 W	—	Thermostatic
BRITISH NATIONAL ELECTRICS LTD. Newarthill, Motherwell, Scotland.	"Britannia" Two-plate	Vertical	36×21×21 (plus 9in splashplate)	Removable side panels	13¼×13⅜×15	2,500 W	—	Thermostatic

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1. *Belling "47AB"*
2. *Belling "64-Plus"*
3. *British National Electrics "Britannia"*

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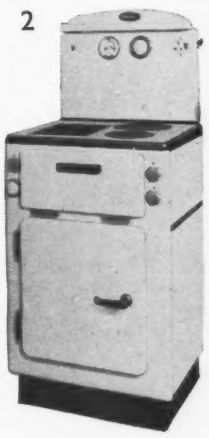

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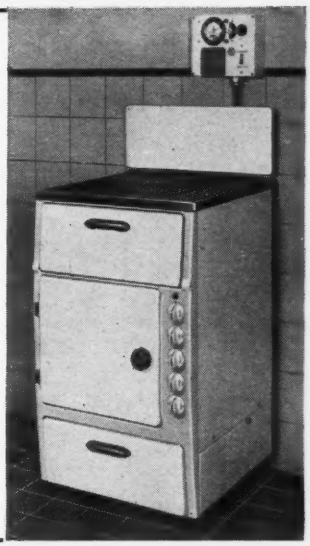
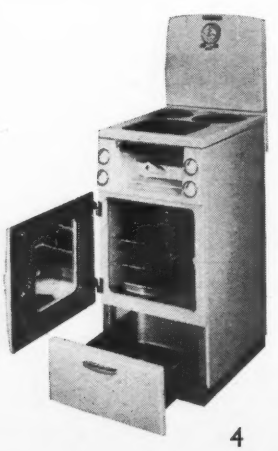


Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer (H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One 8in 2¼ kW One 6in 1 kW "Simmerstat" controlled	10½×8in 2·3 kW grill boiler	7×16⅛×16⅛	—	—	Inner glass door, automatic oven floodlight and (as extra) wheels with brake	White or cream vitreous throughout. (Colours available)	£56 0 0
One 8in 2 kW ("Simmerstat" controlled) and one 6in 1 kW (three-heat control)	10½×8in 2·3 kW grill boiler	6×18½×15½	4×16×15	—	Inner glass door	White or cream vitreous throughout. (Colours available)	£36 6 0
—	10½×8in 2 kW grill boiler	4½×17⅜×15	—	—	Available on stand (£2 4 0 extra) or cabinet (£4 8 0 extra)	White or cream vitreous throughout	£16 0 0
—	9×7in 1·5 kW grill boiler	—	—	—	—	Cream and black vitreous enamel	£8 12 0
One 8in solid 1·8 kW	10×7in 2 kW grill boiler	5×19×14	—	—	Switch interlock limits load to 3 kW	Cream and black vitreous enamel	£21 7 6 (on stand) £23 10 0 (on cabinet)
—	10½×8in 2·3 kW grill boiler	7×10⅜×12⅜	—	—	Three heat or "Simmerstat" control	White or cream and black vitreous enamel	£7 19 6 (three heat) £8 15 0 ("Simmerstat")
One 8in solid 1·8 kW	10×7 2 kW grill boiler	5×19×14	—	—	Auto-oven timer, built-in timer and pilot light	Cream and black vitreous enamel	£33 4 0 (on stand) £35 7 0 (on cabinet)
One 8in solid 2 kW "Simmerstat" controlled, one 6½in solid 1 kW three heat	10½×8 2·3 kW grill boiler	6×18½×15½	4×16×15 (unheated)	—	Auto-oven timer, built-in timer and clock	Cream vitreous enamel. (Colours available)	£43 19 0
One 8in solid 2 kW "Simmerstat" controlled One 6½in solid 1 kW three heat	10½×8 2·3 kW grill boiler	6×18½×15½	4×16×15 (unheated)	—	Auto-oven timer, built-in timer, tubular lamp floodlight, built-in 13A socket outlet	White or cream. (Colours available)	£49 3 0
One 8in solid 2·25 kW One 6½in solid "Simmerstat" controlled	10½×8 2·3 kW grill boiler	7×16½×16½	—	—	Auto-oven timer, built-in timer, tubular lamp floodlight, built-in 13A socket outlet	White or cream, black hob. (Colours available)	£69 17 6
One 8in solid 1,800 W "Simmerstat" control	Grill boiler 2,000 W	6¾×17×17¾	5⅝×16⅝×17⅜	Heated drawer (400 W) £3 12 6 extra, non-heated £1 18 0 extra	Auto-timer control unit £8 0 0 extra. Radiant 8in plate £1 15 0 extra	New ivory, cream handles. Cream, black hob, red handles. White, black hob, red handles.	£32 5 0

Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
BRITISH NATIONAL ELECTRICS, LTD., Newarthill, Motherwell, Scotland. *(continued)*	"Britannia" Three-plate	Vertical	36×21×21 (plus 9in splashplate)	Removable side panels	13½×13½×15	2,500 W	—	Thermostatic
	"C.90"	Vertical	36×21×21 (plus 9in splashplate)	Removable side panels	13½×13⅜×15	2,500 W	—	Thermostatic
CARRON COMPANY, Carron, Falkirk.	L.2	Vertical, legs or plinth	36×22×21	Fixed with single element in bottom	12⅞×14⅞×14	2,400 W	Plug-in special finned sheathed type	Thermostatic
	L.3	Vertical, legs or plinth	36×22×21	Fixed with single element in bottom	12⅞×14⅞×14	2,400 W	Plug-in special finned sheathed type	Thermostatic
CREDA (SIMPLEX ELECTRIC CO., LTD.), Creda Works, Blythe Bridge, Staffs.	E.V.13	Vertical	36×21×19⅝	Fixed, removable sides and base	13⅜×13×13¼	2,500 W	Tubular sheathed	Thermostatic
	"Carefree"	Vertical	53⅛×21×25 (36in to top of hob)	Fixed, removable sides	15⅛×14×14½	2,500 W	Tubular sheathed	Thermostatic
	"Stargazer" 310 and 305	Vertical	43½×18½×23½ (36in to (top of hob)	Fixed, removable sides	13⅜×12⅝×14⅜	2,200 W	Tubular sheathed	Thermostatic
	"Star" 310 and 305	Vertical, leg model	43½×18½×23½ (36in to top of hob)	Fixed, removable sides	13⅜×12⅝×14⅜	2,200 W	Tubular sheathed	Thermostatic
	"Super Comet" D.H.6	Horizontal	50½×36½×25½ (36in to top of hob)	Fixed, removable sides and base	15×14½×16⅝	3,450 W	Tubular sheathed	Thermostatic
DEXRAY ENGINEERING CO., LTD., 34, Ardwick Green South, Manchester, 13	C.2	Table	13×21×15	—	—	—	—	—
	C.10	Table	13×21×15	—	—	—	—	—



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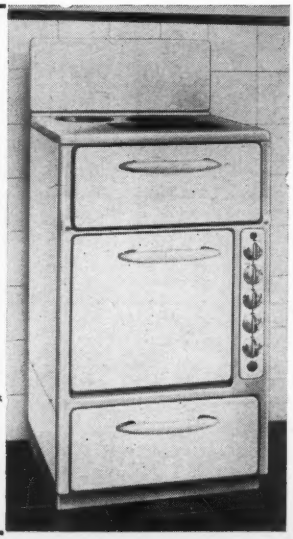

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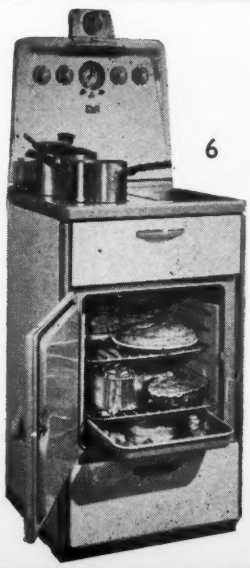

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Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One 8in solid 1,800 W "Simmerstat" One 6½in solid 1,000 W three heat	Grill boiler 2,000 W	6¾×17×17¾	5¾×16⅜×17⅜	Heated drawer (400 W) £3 12 6 extra, non-heated £1 18 0 extra	Auto-timer control unit £8 0 0 extra. Radiant plates £1 12 6 (6½in) and £1 15 0 (8in) extra	New ivory, cream handles. Cream, black hob, red handles. White, black hob, red handles.	£34 19 0
One 8in solid 1,800 W and one 6½in solid 1,000 W three heat	Grill boiler 2,000 W	6¾×17×17¾	5¾×16⅜×17⅜	Heating element for drawer (400 W £1 12 6 extra	Auto-timer control unit £8 0 0 extra. Radiant plates and "Simmerstats" extra	White or two-tone cream	£46 10 0
One 8in solid 1,800 W "Simmerstat" control	10½×8in solid 2 kW grill boiler	5×19×15	—	—	Extra wide oven, glass door 10s 9d extra	Cream with black hob or two-tone colours £1 extra	£30 13 0 (leg) £32 5 0 (plinth)
One 8in solid 1,800 W "Simmerstat" control One 6½in solid 1 kW three-heat control	10½×8in solid 2 kW grill boiler	5×19×15	—	—	Extra wide oven, glass door 10s 9d extra	Mottled grey	£33 7 0 (leg) £34 19 0 (plinth)
One 8in solid 1·8 kW One 6½in solid 1 kW three heat	10½×8 grill boiler 2 kW	4½×17½×13½	7¼×16⅜×17	400 W	Glass oven door £1 18s extra	Two-tone ivory or white	£39 10 0
One 8in radiant 2·3 kW "Simmerstat" controlled One 6½in solid 1 kW three heat	10½×8 grill boiler 2 kW	4½×17½×12½	7¼×17×15½	400 W	Time clock, illuminated hob. Glass door £2 14s extra	Grey/cream, grey/white, all cream or all white, colours extra	£55 10 0
One 8in solid 2 kW "Simmerstat" controlled One 6½in solid 1 kW three heat (model 305—8in plate only)	10½×8 grill boiler 2 kW	4⅜×11¾×17	7×13½×17¾ (unheated)	—	Glass door standard, storage drawer £1 18s extra, timer control £8 12s extra	Cream or white, colours extra	£34 19 0 (310) £32 5 0 (305)
One 8in solid 2 kW "Simmerstat" controlled One 6½in solid 1 kW three heat (model 305—8in plate only)	10½×8 grill boiler 2 kW	—	—	—	Solid door	Grey and white, cream	£33 7 0 (310) £30 13 0 (305)
Two 8in radiant 2 kW each Two 6½in radiant 1 kW each all "Simmerstat" controlled	Separate grill 1,500 W	5½×13½×14½	6½×13½×16	400 W	Auto-time control, illuminated hob, drop-down oven door, grill warming drawer	Cream or white	£131 14 0
One 6½in solid 1 kW "Simmerstat" controlled	10½×8 grill boiler 2 kW three heat	11×6¼×14	—	—	—	Vitreous enamelled top-plate, cream body	£12 5 0
Two 6½ in radiant	—	—	—	—	—	Vitreous enamelled top-plate, cream body	£12 18 4

7

4. *"Creda" "Stargazer" 310 (Simplex Electric)*
5. *B.N.E. C.90 cooker*
6. *"Creda" "Carefree" (Simplex Electric)*
7. *Carron L.2 model*
8. *Carron L.3 plinth model*

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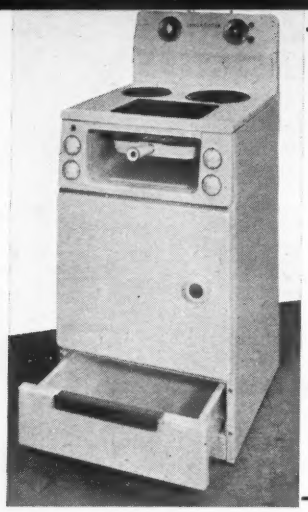

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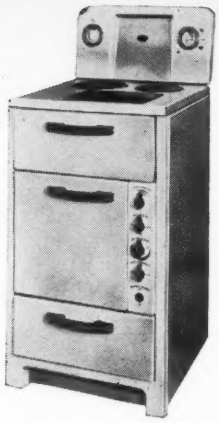

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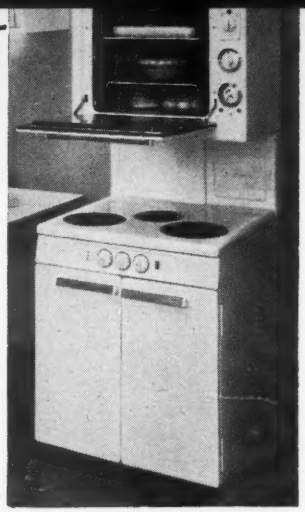

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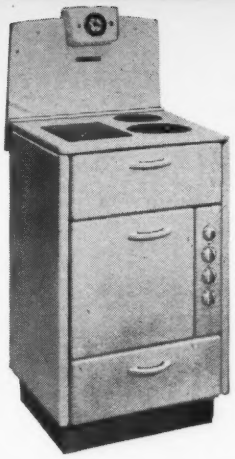
Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
ENGLISH ELECTRIC CO., LTD., Queens House, Kingsway, London, W.C.2.	2009D	Plinth	36×22×23⅓ (plus 6½in splashplate)	Fixed, removable element guards	14×13⅜×15⅛	2,800 W	Two plug-in spirals and two rod type	Thermostatic
	2011	Plinth	52½×22×24 (36in to top of hob)	Fixed, removable element guards	14×13⅜×15⅛	2,800 W	Two plug-in spirals and two rod type	Thermostatic
	2020	Plinth, raised oven	61×25¼×26 (30in to top of hob)	Fixed, removable element guards	14⅜×14½×13½	2,500 W	Two banks of spirals and two rod type	Thermostatic
	2030	Plinth	36×21×22⅜	Fixed, removable element guards and base plate	13¾×13⅜×17½	2,600 W	Two tubular sheathed	Thermostatic
	2031	Plinth	36×21×22⅜	Fixed, removable element guards and base plate	13¾×13⅜×17½	2,600 W	Two tubular sheathed	Automatic oven timer and thermostat
FALCO ELECTRICAL APPLIANCES, LTD., Corporation Road, Audenshaw, Manchester.	"Royal" Mark III	Vertical, plinth	49×23×23½ (36in to top of hob)	Removable (5-piece)	16½×17⅓×15½	3,500 W	Sheathed plug-in	Thermostatic and auto-timer
	"Royal" Mark IV	Vertical, plinth	49×23×23½ (36in to top of hob)	Removable (5-piece)	16½×17⅓×15½	3,500 W	Sheathed plug-in	Thermostatic and auto-timer
	"Freedom"	Vertical, plinth	36×22½×19½	Removable (3-piece)	13×13×14⅓	2,400 W	Plug-in ceramic	Thermostatic and auto-timer
	16B	Vertical, plinth	36×22½×19½	Removable (3-piece)	13×13×14⅓	2,400 W	Plug-in ceramic	Thermostatic
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2.	DC114	Vertical plinth	44×21×21	Removable (3-piece)	13×13½×15¼	2,450 W	Sheathed wire	Thermostatic
	DC756 and DC757 DC757D DC757GD	Vertical legs (DC756) and plinth (DC757)	43¼×18⅛×21	Removable (3-piece)	13⅓×13⅜×14⅜	2,425 W	Sheathed wire	Thermostatic



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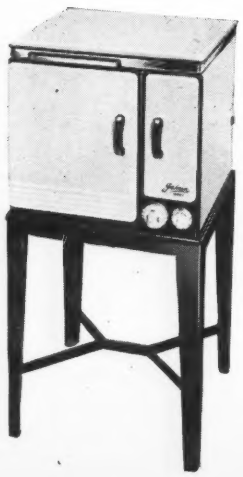
9. *English Electric model 2031*
10. *G.E.C. model DC.114*
11. *English Electric model 2020 raised-oven cooker*
12. *Falco "Freedom"*
13. *Falco "Royal" mark IV 4-plate cooker*

13

Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer (H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One 8in solid 1·8 kW "Simmerstat" controlled and one 6½in solid 1 kW three heat	10½×8in 2·5 kW grill boiler (three heat)	5×18½×18½	5½×18×17⅞	—	Optional glass oven door, cast iron frame	Cream or white	£45 10 0
One 8in solid 1·8 kW and one 6½in solid 1 kW "Simmerstat" controlled	10½×8in 2·5 kW grill boiler ("Simmerstat" controlled)	5×18×17½	5½×18×17⅞	—	Plug-in control panel, auto-timer, 4-hr ringer and 13 A shuttered outlet	Cream or white	£66 5 0
Two 8in radiant 1·8 kW each and one 6½in radiant 900 W "Simmerstat" controlled	13×8in 2·5 kW grill in oven ("Simmerstat" controlled)	6½×22×15¾ (400 W)	13⅜×22×24 (storage) cupboard)	—	Grill "booster" control for rapid oven pre-heating, auto-control oven and hot cupboard	Cream or white and with colour hob	£75 0 0
One 8in solid 1·8 kW "Simmerstat" controlled and one 6½in solid 1 kW three heat	10½×8 2·5 kW grill boiler (three heat)	4⅜×13½×15½	5⅛×17⅞×18	—	Interior oven light, lipped hob. Hob light and glass oven door optional extras	Champagne or white	£37 10 0
One 8-in solid 1·8 kW "Simmerstat" controlled and one 6½in solid 1 kW three heat	10½×8 2·5 kW grill boiler (three heat)	4⅜×13¼×15½	5⅛×17⅞×18	—	Auto control panel with timer and 5-hr ringer, interior oven light, lipped hob. Hob light and glass oven door optional extras	Champagne or white	£44 12 6
Two 8in radiant 2 kW each one 6½in radiant 1·2 kW Simmer control	3 kW grill Simmer control	4×17⅞×16	—	—	Auto-timer control with warning pinger on both oven and R.H. 8in hotplate	White, cream, pastel blue and pastel green	£84 0 0
Two 8in radiant 2 kW each Two 6½in radiant 1·2 kW each Simmer control	3 kW grill Simmer control	4×17½×16	—	—	Auto-timer control with warning pinger on both oven and R.H. 8in hotplate	White, cream, pastel blue and pastel green	£92 8 0
One 8in solid 1·8 kW Simmer control One 6½in solid 1 kW three heat	10½×8 grill boiler solid 2 kW	5×18×13¼	5½×16½×17 (unheated)	—	Auto-timer, warning pinger radiant plates and additional "Simmerstats" optional extras	Cream or white with cream, white or black hob	£52 18 0
One 8in solid 1·8 kW One 6½in solid 1 kW three heat	10½×8 grill boiler 2 kW	5×18×13½	5½×16½×17 (unheated) optional extra	—	Drop-down door, self-indicating switch knobs, radiant plates and additional "Simmerstats" optional extras	Cream, green and cream, white with cream, white or black hob	£38 5 0
One 8in solid 1·8 kW Simmer switch controlled One 6½in solid 1 kW three heat	10½×8in grill boiler 2 kW	6½×17⅞×18¼	5½×13¼×20	400 W	Drop down oven door, auto-control panel £13 15 0 extra	Green and cream, two-tone ivory, white or white with black hob	£42 18 0
One 8in solid 1·8 kW Simmer switch controlled One 6½in solid 1 kW three heat	10½×8in grill boiler 2 kW	6×11⅞×16⅜	6×12×20 (DC757D and DC757GD)	—	Auto-control panel £10 15 0 extra. Storage drawer (DC757D). Full view glass door and storage drawer (DC757GD)	Honeysuckle or gleaming white	£33 7 0 (DC756) £34 19 0 (DC757) £36 17 0 (DC757D) £37 13 0 (DC757GD)

Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. *(continued)*	DC456 and DC457 DC457D	Vertical legs (DC456) and plinth (DC457)	43¼ × 18½ × 21	Removable (3-piece)	13⅜ × 13⅜ × 14⅜	2,425 W	Sheathed wire	Thermostatic
L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, London, W.C.2.	LGH600/601 "Ovenette"	Portable	8 × 14 diameter	—	—	700 W	Annular channel heating	—
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex.	"Regal"	Breakfast	7 × 9⅜ × 12⅜	—	4 × 11 × 8	—	—	—
	"Chalex"	Table	7⅜ × 17 × 11¼	—	6¼ × 11½ × 10⅜	—	Wide porcelain	Three heat
JACKSON ELECTRIC STOVE CO., LTD., Dallow Road, Luton, Beds.	69 "Giant"	Table	16 × 18 × 18¼	Fixed	8⅜ × 10 × 13¼	1,100 W	Tubular sheathed (base) spirals (top)	Thermostatic
	192J	Vertical, drawer	44½ × 21 × 17⅜ (36in to top of hob)	Removable element guards	12⅜ × 12½ × 16½	1,780 W	Plug-in spirals in ceramic tubes	Thermostatic
	194J	Vertical, drawer	44½ × 21 × 21 (36in to top of hob)	Removable element guards	12⅜ × 12½ × 16½	2,100 W	Plug-in spirals in ceramic tubes	Thermostatic
	"Two-ninety"	Vertical, legs, drawer	42½ × 23⅜ × 17⅜ (36in to top of hob)	Removable element guards	12⅜ × 12½ × 13¾	1,780 W	Plug-in spirals in ceramic tubes	Thermostatic
	390J	Vertical, legs, plinth, drawer	45 × 20½ × 22½ (36in to top of hob)	Removable element guards	14½ × 13½ × 15⅝	2,500 W	Tubular sheathed	Thermostatic
	391J	Vertical, legs, plinth, drawer	45 × 20½ × 22½ (36in to top of hob)	Removable element guards	14½ × 13½ × 15⅝	2,500 W	Tubular sheathed	Thermostatic
	392J	Vertical, plinth, drawer	45 × 20½ × 22½ (36in to top of hob)	Removable element guards	14½ × 13½ × 15⅝	2,500 W	Tubular sheathed	Thermostatic
	394J	Vertical, plinth, drawer	45 × 20½ × 22½ (36in to top of hob)	Removable element guards	14½ × 13½ × 15⅝	2,500 W	Tubular sheathed	Thermostatic



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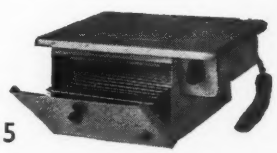

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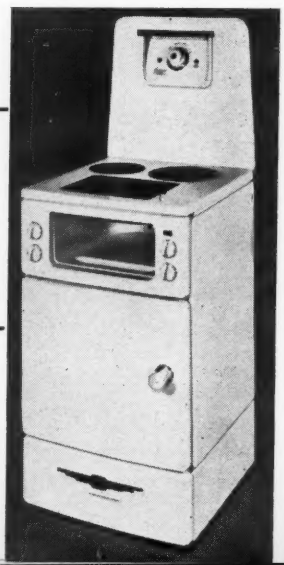

14. *Jackson 69 "Giant" complete with stand*

15. *Hounslow "Chalex" table cooker*

16. *Jackson model 394J fitted with auto control*

Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer (H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One 8in solid 1·8 kW Simmer switch controlled	10½×8in grill boiler 2 kW	6×11¾×16⅝	6×12×20 (DC457D)	—	Auto-control panel £10 15 0 extra. Storage drawer (DC457D)	Honeysuckle or gleaming white	£30 13 0 (DC456) £32 5 0 (DC457) £34 3 0 (DC457D)
—	Grilling can be done in oven	—	—	—	Viewing cooking window, capacity increasing collar	Aluminium	£4 19 6
—	9×7in 750 W grill boiler	—	—	—	—	Sage green stoved enamel	£3 0 0
—	10×8in 1·8 kW grill boiler	—	—	—	—	Grey mottled stoved enamel	£6 17 9
One 7in radiant "Simmerstat" controlled	Grill in top of oven 800 W	10½×5½×13½	—	—	Stand complete with potshelf £2 0 0 extra	Cream and black or white and black or eau-de-nil turquoise top	£19 10 0
One 8in solid "Speedring" 2 kW (six heat)	10½×8in 2 kW grill boiler	4½×18×13¾	6×16½×14½	500 W	Glass oven door. Auto-control unit, radiant hotplates and "Simmerstats" extra	Two-tone ivory or all white	£40 10 0 (cold drawer) £42 12 6 (heated drawer)
One 8in solid "Speedring" 2 kW One 6½in solid "Speedring" 1·350 kW (six heat)	10½×8in 2 kW grill boiler	4½×18×18½	6×16½×19	500 W	Glass oven door. Auto-control unit, radiant hotplates and "Simmerstats" extra	Two-tone ivory or all white	£45 15 0 (cold drawer) £47 17 6 (heated drawer)
One 8in solid "Speedring" 2 kW (six heat)	10½×8in 2 kW grill boiler	5¾×17½×11	6½×17½×14½ (unheated)	—	Towel rails rollers on back legs. Radiant hotplates	Cream with green legs, white with grey legs, or all cream	£30 13 0 (legs) £32 11 0 (drawer)
One 8in solid 2 kW "Speedring" (six heat)	10½×8in grill boiler2 kW	14⅞×12½×17½	8⅜×17½×14½ (unheated)	—	"Cookalone" auto-control unit, radiant hotplate and "Simmerstat" extra	All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front	£30 13 0 (legs) £32 5 0 (plinth) £34 3 0 (drawer)
One 8in solid "Speedring" 2 kW (six heat) One 6½in solid "Speedring" 1·350 kW (six heat)	10½×8in grill boiler 2 kW	14⅞×12½×17½	8⅜×17½×14½ (unheated)	—	"Cookalone" auto-control unit, radiant hotplates and "Simmerstat" extra	All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front	£33 7 0 (legs) £34 19 0 (plinth) £36 17 0 (drawer)
One 8in solid "Speedring" 2 kW (six heat)	10½×8in 2 kW	14⅞×12½×17½	8⅜×17½×14½	500 W	Glass oven door. "Cookalone" auto-control unit, radiant hotplates and "Simmerstat" extra	All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front	£34 12 6 (plinth) £36 12 6 (cold drawer) £39 12 6 (heated drawer)
One 8in solid "Speedring" 2 kW (six heat) One 6½in solid "Speedring" 1·350 kW (six heat)	10½×8in 2 kW	14⅞×12½×17½	8⅜×17½×14½	500 W	Glass oven door. "Cookalone" auto-control unit, radiant hotplates and "Simmerstat" extra	All cream or all white or with eau-de-nil or turquoise blue relief on splash plate, hob and plinth or drawer front	£37 7 6 (plinth) £39 7 6 (cold drawer) £42 7 6 (heated drawer)

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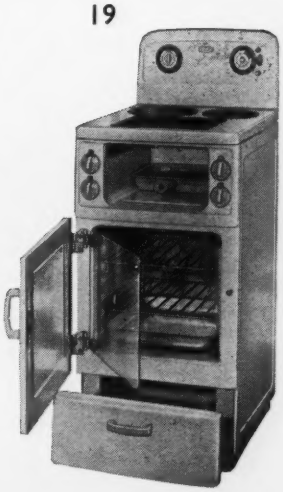
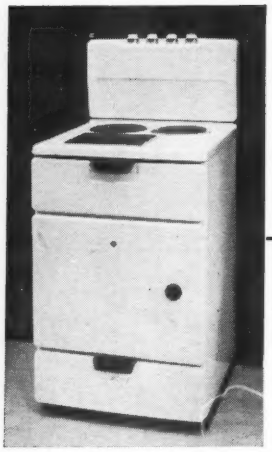


17. *Jackson 390J cooker*
18. *L. G. Hawkins "Ovenette"*
19. *G.E.C. model DC.757GD*



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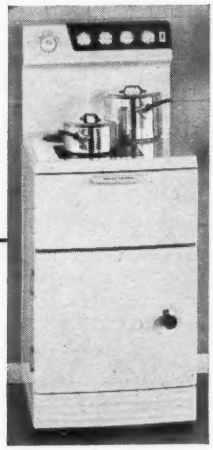

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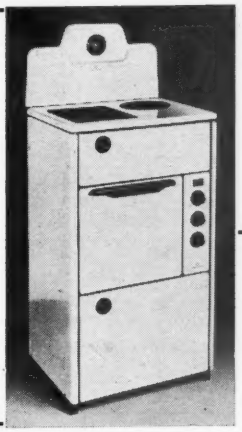
Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
MOFFATS, LTD., 1, Newman Street, London, W.1.	40B90W	Horizontal	49×40×28½	Fixed, two ovens	15½×21×20 and 15½×13½×20	"Bakemaster" Top: 3 kW Bottom: 2·4 kW "Thrift" Top: 3 kW Bottom: 1·5 kW	Spiral and "Conrad"	Synchromatic
	40B70W	Horizontal	49×40×28½	Fixed	15½×21×20	Top: 3 kW Bottom: 2·4 kW	Spiral and "Conrad"	Synchromatic
	30B75W	Vertical	49×30×28½	Fixed	15½×24×18½	Top: 3·3 kW Bottom: 2·4 kW	Spiral and "Conrad"	Synchromatic
	24B80W	Vertical	49×24×28½	Fixed	15½×21×20	Top: 3 kW Bottom: 2·4 kW	Spiral and "Conrad"	Synchromatic
REVO ELECTRIC CO., LTD., Tipton, Staffs.	"Revomatic"	Vertical, plinth	53½×23×24 (36in to top of hob)	Removable	14×15⅞×13¾	2,100 W	Sheathed	Thermostatic
	"Regal"	Vertical, plinth	48⅞×23×24 (36in to top of hob)	Removable	14×15⅞×13¾	2,100 W	Sheathed	Thermostatic
	"Regent" 552	Vertical, legs or plinth	45×21×21½ (36in to top of hob)	Removable	13½×13¾×14	2,100 W	Sheathed	Thermostatic
	"Regent" 553	Vertical, legs or plinth	45×21×21½ (36in to top of hob)	Removable	13½×13¾×14	2,100 W	Sheathed	Thermostatic
	"Peerless" Major	Table, or on stand or cabinet	17⅞×21×15½	Fixed	12¼×11⅝×13	Grill: 2,000 W Bottom: 900 W	Spiral on ceramic former	Thermostatic
TRICITY COOKERS, LTD., 109, Kingsway, London, W.C.2.	528	Vertical	36×19¾×16	Fixed	10½×11½×12¼	1,150 W	Coil former	Thermostatic
	"Queen" 535	Vertical	52×22×22 (36in to top of hob)	Fixed	14⅞×15⅝×14½	2,490 W	Plug-in tubular	Thermostatic

20. *Revo "Regal"*
21. *Revo "Revomatic"*
22. *Tricity "Viscount"*
23. *Tricity "Coronet"*
24. *Moffat 40B90W cooker*



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Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer (H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One "Thermo-Guard" 2·2 kW, one at 1·9 kW, three at 1·3 kW each	Top oven element for grilling	All ovens have "warm" position	Two: 9×21×20 and 9×13½×20	—	"Hi-Lo-Matic" oven racks	Titanium white	£182 0 0
One "Thermo-Guard" 2·2 kW, three at 1·3 kW	Separate grill in left hand oven	All ovens have "warm" position	Two: 9×21×20 and 9×13½×20	—	"Hi-Lo-Matic" oven racks	Titanium white	£159 0 0
One "Thermo-Guard" 2·2 kW, three at 1·3 kW	Top oven element for grilling	All ovens have "warm" position	9×24×18½	500 W	"Hi-Lo-Matic" oven racks	Titanium white	£139 0 0
One "Thermo-Guard" 1·3 kW, one at 1·9 kW, two at 1·3 kW	Top oven element for grilling	All ovens have "warm" position	9×21×20	500 W	"Hi-Lo-Matic" oven racks	Titanium white	£115 0 0
One 8in solid and one 8in radiant 1·8 kW each, "Simmerstat" controlled	16×8 grill boiler 3 kW	5½×16¾×20	4×17⅜×16½ (unheated)	—	Choice of five separate coloured hobs	Standard body colours—white or cream. Standard hob colours—ancona black, two-tone ivory, Windsor grey. Option of 5 coloured hobs (extra)	£74 10 0
Two 8in solid 1·8 kW each, one "Simmerstat" controlled, one three heat	10½×8 grill boiler 2·2 kW	5½×16¾×20	4×17⅜×16½ (unheated) optional extra	—	Choice of five separate coloured hobs; option of time control		£39 0 0
One 8in solid 1·8 kW "Simmerstat" controlled	10½×8 grill boiler 2·2 kW	5×13×19	—	—	Utensil compartment, choice of coloured hobs; glass door and time control optional		£30 13 0 (legs) £32 5 0 (plinth)
One 8in solid 1·8 kW "Simmerstat" controlled One 6¼in solid 1 kW three heat	10½×8 grill boiler 2·2 kW	5×13×19	—	—	Utensil compartment, choice of coloured hobs; glass door and time control optional		£33 7 0 (legs) £34 19 0 (plinth)
One 6¼in solid 1 kW "Simmerstat" controlled	10×7 grill boiler 2 kW	10½×7×13	—	—	Suitable for 13A outlet. Radiant hotplate extra	Grey and white or grey and cream; option of coloured hobs	£20 18 6
One 6½in solid 1 kW three heat	10½×8 grill boiler 2 kW	4×11⅛×12¼	—	—	Selector switch eanbles cooker to be used off 13/15A circuit	Ivory or white	£21 7 0 £24 11 6 (with cabinet)
One 8in radiant 1·7 kW, one 6½in solid 1 kW "Simmerstat" controlled	Grill boiler 2·25 kW "Simmerstat" controlled	7×13×16	—	—	Auto-timer control, 13A socket outlet	Ivory or white, maroon handles and knobs	£68 5 0

Manufacturer	Name or Model	Type	Size (H.W. & D. in inches)	Oven Type	Oven Size (H.W. & D. in inches)	Oven Loading	Type of Element	Oven Control
TRICITY COOKERS, LTD., 109, Kingsway, London, W.C.2. (*continued*)	"Coronet" 550	Vertical	44×20⅜×21¼ (36in to top of hob)	Removable sides	10½×11⅜×12½	1,150 W	Coil former	Thermostatic
	"Trivet" 555	Breakfast	10×19½×11	—	—	—	Spiral	—
	"Viscount" 575	Vertical	50⅞×21×23½ (36in to top of hob)	Removable sides	15½×15×15½	2,400 W	Plug-in tubular	Thermostatic

Hot Plates	Grill or Grill Boiler	Hot Cupboard or Grill Compartment (H.W. & D. in inches)	Storage Drawer (H.W. & D. in inches)	Storage Drawer Loading	Special Features	Finish	Price
One 8in solid 1·8 kW "Simmerstat" controlled	Grill boiler 1·8 kW	4½×12×12	—	—	Auto-control panel £7 7 0 extra. Tailored ovenware £2 3 0 extra plus 4s 9d P.T.	Ivory or white	£27 5 0
—	Grill boiler 2·25 kW	5½×11×10	—	—	Suitable for use in dining room	Grey doors, white hob, endplates in choice of four colours	£12 0 0
One 6½in solid 1 kW, one 8in solid 1·8 kW "Simmerstat" controlled	Grill boiler 2·25 kW	7⅛×18×18½	—	—	Large oven, left or right hand door opening. Time switch £5 5s 0 extra	Ivory or white with choice of coloured facia panels	£37 13 0

CATALOGUES AND LISTS

CONDUIT.—Brochure giving prices and particulars of "Kopex" electrical conduit and accessories.—**Uni-Tubes, Ltd.,** Alpha Works, Alpha Street, Slough, Bucks.

CONNECTORS.—Catalogue (T/2) illustrating and describing the range of "Telconnectors" including plugs, sockets, joints and terminations for use with "Telcon" radio frequency cables.—**Telegraph Construction & Maintenance Co., Ltd.,** Mercury House, Theobald's Road, London, W.C.1.

DUST COLLECTION.—40-page illustrated brochure, "Modern Dust Collection," describing equipment produced by the company.—**Visco Engineering Co., Ltd.,** Stafford Road, Croydon, Surrey.

ELECTRONIC COMPUTERS.—24-page booklet which explains the operation of electronic computers and some of the ways in which these computers can be of use to the steel industry.—**British Iron & Steel Research Association,** 11, Park Lane, London, W.1.

Illustrated folder dealing with universal and special purpose electronic digital computers.—**English Electric Co., Ltd.,** Kidsgrove, Stoke-on-Trent, Staffs.

FLUORESCENT LAMPS. — Leaflet (F/57) giving particulars of the types and colours of a range of cold cathode lighting tubes available from the company.—**Parkinson & Worden, Ltd.,** 49, King Street, Blackburn.

HEATING ELEMENTS.—Leaflet illustrating various types of replacement elements for electric fires.—**S. I. Engel,** 23-25, Kensington Park Road, London, W.11.

METALS.—46-page booklet dealing with tungsten, molybdenum and other metals and alloys manufactured by the company and a further booklet describing the characteristics and industrial applications of G.E.C. "Heavy Alloy."—**General Electric Co., Ltd.,** Osram Lamp Works, Wembley, Middlesex.

MOTOR CONTROL GEAR. — Four leaflets (DO60, SD60, SR60 and AT60) dealing respectively with new ranges of direct-on-line, automatic star-delta, automatic stator rotor and automatic auto-transformer starters. —**British Klockner Switchgear, Ltd.,** Chertsey, Surrey.

PLASTIC PRE-HEATERS.—Illustrated 12-page catalogue describing the company's new range of "Radyne" plastic pre-heaters. —**Radio Heaters, Ltd.,** Eastheath Avenue, Wokingham, Berks.

PRINTED CIRCUITS.—Brochure setting out the advantages of the use of printed circuits.—**Technograph Printed Circuits, Ltd.,** 32, Shaftesbury Avenue, London, W.1.

PROTECTIVE DEVICES. — 34-page booklet entitled "Protective Devices Applied to Electrical Switchgear."—**English Electric Co., Ltd.,** East Lancashire Road, Liverpool, 10.

RECTIFIERS.—Leaflet giving advance information on a new range of selenium rectifiers known as the "Series 400."—**Standard Telephones & Cables, Ltd.,** Edinburgh Way, Harlow, Essex.

REFRIGERATOR PARTS. — 80-page thumb indexed catalogue covering a range of refrigerator fittings, tools and controls, etc.— **HPR, Ltd.,** 99, King's Road, Chelsea, London, S.W.3.

SMOKE DENSITY INDICATORS.—Folder illustrating and describing photo-electric smoke density indicators for industrial chimneys.—**Radiovisor Parent, Ltd.,** Stanhope Works, High Path, London, S.W.19.

SWITCHES.—48-page catalogue (131) illustrating and describing a range of switches, including toggle types, micro gap, and rotary patterns, and mains voltage signal lamps of various types, together with details of other products of the company.—**Arcolectric (Switches), Ltd.,** West Molesey, Surrey.

SWITCHGEAR.—147-page illustrated and priced catalogue (G557) covering the company's range of switchgear and wiring accessories.—**Bill Switchgear, Ltd.,** Aston Lane, Perry Barr, Birmingham, 20.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 14th September:—

No. 764,127 (design). Class 7. Electric welding machines.—W. Heine, trading as Hauptmann K.G., Hamburg-Altona, Germany. Address for service, c/o J. Longman, Jessel Chambers, 88-90, Chancery Lane, London, W.C.2.

PANAX. No. 762,929. Class 9. Electrical, radio and scientific apparatus and instruments, talking machines and calculating machines, etc. —Panax Equipment, Ltd., 173, London Road, Mitcham, Surrey.

PERMAFLON. No. 763,565. Class 9. Electrical, signalling, industrial-chemical and laboratory apparatus and instruments; and electric conduit material and conduit fittings. —Permali, Ltd., 125, Bristol Road, Gloucester.

MINIVAC. No. 763,819. Class 9. Electric vacuum cleaning apparatus.—Bylock Electric, Ltd., 109, South Street, Enfield, Middx.

ANTEX. No. 764,772. Class 9. Electric soldering irons.—Anglo Netherland Technical Exchange, Ltd., 3, Tower Hill, London, E.C.3.

MICRO-MIN. No. 765,742. Class 9. Electric cables and insulated electric wire.—J. Day & Co. (Derby Works), Ltd., Harrow Manor Way, Abbey Wood, London, S.E.2.

GENERATION AND DEVELOPMENT

Underground Gasification Project

The Central Electricity Authority has received consent from the Minister of Power for the construction of a pilot power station at Newman Spinney, near Chesterfield, Derbyshire, to be operated in conjunction with the underground gasification project of the National Coal Board. The station, which will be a temporary one, will contain one 3,750 kW turbo-generator and associated boiler, and there will be an induced draught cooling tower having a capacity of 250,000 gal/hr.

The consent is subject to the conditions that the site shall be restored to its present state by 31st December, 1967, and that the local planning authority shall be given an opportunity to comment on final details of the proposals before works are commenced.

Last December a contract was awarded to Humphreys & Glasgow, Ltd., for the construction of a pilot plant to provide gas for a power station to be erected by the C.E.A. It was then stated that the company was to prepare plans for a full-scale plant to be erected if the preliminary results justified it.

Nuclear Power in North Scotland

The Scottish Home Department has informed Peterhead Local Employment Committee that test borings have been made at Crimond, Aberdeenshire, but so far no final decision has been reached with regard to the construction of an atomic energy station in that area. Lord Strathclyde, Minister of State, Scottish Office, speaking at a Press conference in Edinburgh last week after a 900-mile tour of Scottish power generating centres, said that the nuclear power programme for the United Kingdom in its new expanded form left room for a second generating station in Scotland and the North of Scotland Hydro-Electric Board had been seeking a site for some months.

On the subject of current developments, Lord Strathclyde said that the Hydro-Electric Board and the South of Scotland Electricity Board planned to commission 1,000 MW of new generating plant in the next five years.

Within the next two years, the capacity of the hydro stations in the North of Scotland area would be 860 MW. The plutonium works at Chapelcross, Annan, would be contributing 114 MW to the public supply by 1959.

Monkton and Ayr Reinforcement Schemes

An £86,100 scheme for the reinforcement of supplies at Monkton and Ayr to meet the increasing loads there has been approved by the South of Scotland Electricity Board. It involves the reconstruction of a 33/11 kV substation in Heathfield Road, Ayr, to be supplied by a new 33 kV overhead line from Coylton. The work is expected to be completed in 1959.

Supplies to Galashiels and Selkirk are also to be reinforced by the Board at an estimated cost of £36,000. This work, scheduled for completion next year, provides for the raising of the voltage of the Galashiels-Selkirk overhead line from 22 to 33 kV and for the installation of larger transformers at Selkirk.

Power Failure in Middlesex

A major electricity breakdown occurred at about 1 p.m. last Sunday in Eastcote, Ruislip and parts of Pinner (Middlesex). Engineers of the Eastern Electricity Board were late in the afternoon still trying to trace the cause. An official stated later that they were dealing with two breakdowns covering an area from Pinner to Northolt. Northolt Aerodrome and the United States Air Force base at South Ruislip were without power.

Sheffield Lighting Policy

Wherever sodium lamps have replaced either the gas or metal filament types in Sheffield the Lighting Department has been complimented on the greatly improved quality of the lighting, says Councillor J. Pate, chairman of the Lighting Sub-Committee, in a foreword to the Department's 1956-57 report. Referring to criticisms in some quarters on the appearance of concrete columns, he expresses the view that the majority of people feel that these columns do not detract from the amenities of any district in the city.

The Department expects to extend sodium lighting along bus routes and secondary roads and also to tackle some of the side roads during the next twelve months.

The city lighting engineer (Mr. C. J. Chisholm) reports that the number of electric lamps in use at 31st March was 20,334 (against 19,245 a year ago) while gas lamps numbered 11,025 (11,468). A graph shows that the cost of lighting per head of the population last year was 101·7d, a reduction of 18d. Malicious damage was again a serious problem, the cost of repairs being £1,014, an increase of £430.

Street Lighting Plans

Street lighting in **Chelsea** is to be converted from gas to electricity at an eventual cost of more than £200,000. Expenditure on the first stage is estimated at £80,000.

Grimsby Town Council has approved in principle a scheme costing £5,073 for further street lighting improvements.

Paddington Works Committee has approved an estimate of £32,027 for the conversion of street lighting from gas to electricity in various streets under a 1957-58 programme, and it is now proposed to accept the tender of Concrete Utilities, Ltd., at £11,640, for the supply and installation of the new lighting in the streets in such programme. Further expenditure of £17,422 will be necessary for associated works.

Prestatyn U.D.C. is making application to the Ministry of Housing and Local Government seeking approval of a scheme to convert all gas street lamps to electricity on the south side of the railway line at an estimated cost of £15,590. Installation of electric street lighting throughout the town would cost £23,685.

Improvements in lighting the main streets of **Taunton,** costing £17,515, were approved by the Town Council on 13th August. Fluorescent lamps will be installed in the central areas and sodium lights in other streets leading to the main thoroughfares.

Power Station and Transmission Contracts

The Central Electricity Authority has placed contracts during the past month for power stations, transmission lines and transforming stations, amounting in the aggregate to £15,348,440. The principal contracts include the following:—

Staythorpe "B" power station: Three 120 MW reheat boilers.—John Brown Land Boilers. H.p. pipework and valves.—Babcock & Wilcox. Coal handling plant.—A. J. Jenkins & Co.

West Thurrock: Two 200 MW reheat boilers.—Babcock & Wilcox. One 200 MW turbo-generator, condensing and feed heating plant.—C. A. Parsons & Co.

High Marnham: Main building superstructure.—Sir Alfred McAlpine & Sons.

Meaford "B": Wagon marshalling equipment.—Nortons Tividale.

Aberthaw: Coal handling plant.—Babcock & Wilcox.

Ferrybridge "B": Cooling tower.—Davenport Engineering Co.

Uskmouth "B": Coal handling plant.—Babcock & Wilcox.

Padiham "B," nr. Burnley (correction of previous notice): 120 MW reheat boilers.—Simon-Carves (one) and Babcock & Wilcox (one).

West Thurrock substation: 275 kV switchgear.—A. Reyrolle & Co.

Uskmouth power station, Pyle: 275 kV overhead line.—J. L. Eve Construction Co.

Norwich substation: 132 kV switchgear.—English Electric Co.

Summer Lane substation: 132 kV switchgear.—A. Reyrolle & Co.

Hull (Sculcoates) substation: Two 30 MVA, 132/6·6 kV and two 45 MVA, 132/22 kV transformers.—Fuller Electrical & Manufacturing Co.

Agecroft substation: 132 kV switchgear.—Metropolitan-Vickers Electrical Co.

Staythorpe substation: Two 120 MVA, 275/132 kV auto-transformers.—British Thomson-Houston Co.

Crewe substation: One 45 MVA, 132/33 kV transformer.—C. A. Parsons & Co.

Neath substation: One 45 MVA, 132/33 kV transformer.—Fuller Electrical & Mfg. Co.

Fleet substation: 132 kV switchgear.—Metropolitan-Vickers Electrical Co.

Financial Section

STOCKS and SHARES

VARIOUS factors are conspiring to hinder the expansion of investment activity which the Stock Exchange expects as a rule to experience after the end of August. In the gilt-edged market the recent currency disturbances, with their pressures on the pound and on the nation's gold reserves, have continued to exercise an uncertain influence on the course of prices. In the industrial and allied markets, similarly unsettling effects have been produced by Wall Street's show of indecision about business prospects in the U.S.A. Share prices have, however, been fairly steadily maintained. For the electrical sections of the market encouragement materialised in the shape of good figures in the A.E.I. group's half-yearly statement, and in the annual results of A. C. Cossor.

A.E.I. Interim Report

The market was favourably impressed by the half-yearly progress report of Associated Electrical Industries. Although the trading profit (before depreciation) of £6·76 million for the first six months of this year is below the £7·32 million earned in the corresponding half of 1956, it is well above the figures for the second part of last year. Also, it has been achieved despite substantial losses arising from the engineering strike during the period. Since the latter ended in April, output and profits are stated to have been rising, while orders received in the latest period, to the value of £84½ million, were higher than in either of the two previous halves. Having improved by half-a-crown to 62s 6d after these announcements, the company's £1 ordinary shares are showing now a yield of 4·8 per cent on the basis of the 15 per cent dividend.

Price Changes

Effects of the A.E.I. half-yearly statement produced no great change in quotations for shares in other of the big electrical groups, but in the market the tone gained perceptibly in confidence; more was heard of the view that time will show with increasing clearness the value of the industry's continuously heavy capital expenditure programmes. Among the heavy engineering shares, Simon-Carves and Head Wrightson picked up part of recent declines. Interest in shares with radio associations increased with the opening of the annual exhibition, and noticeably favoured Plessey, which regained 3s further to 75s 6d. Pye also recovered well from last month's setback, and better prices ruled for Decca, E.M.I. and E. K. Cole. Elsewhere, Greenwood & Batley moved up to 50s, their best price of the year.

Elliott-Automation

Shareholders in Elliott Brothers (London) and Associated Automation now have full particulars of the proposal for the amalgamation of the two firms into a holding company under the title Elliott - Automation. As previously known, the offer is of eight 5s ordinary shares in the new company for every four Elliott Brothers or five Associated

Price Changes in

Company or Board	Nom. Value	Middle price 2nd Sept.	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield %	1957 Highest	1957 Lowest
Gilt-edged Stocks						£ s d		
Brit. Elec. 1968/73	100	71½		3	3	4 4 0	80	71½
Brit. Elec. 1974/77	100	68½		3	3	4 7 6	78½	68½
Brit. Elec. 1976/79	100	73	+½	3½	3½	4 15 9	81½	72½
Brit. Elec. 1974/79	100	82½		4¼	4¼	5 3 0	92½	82½
Overseas Electric Supply								
Calcutta Elec.	£1	17/6	+1/3	6†	6†	6 17 3†	19/-	15/-
East African Power	£1	20/6		7	7½	7 6 3	21/-	19/-
Nigerian Elec.	£1	17/6		10	10	11 8 6	18/6	17/3
Perak Hydro-Elec.	£1	18/-	+6d	10	10*	11 2 3	18/-	13/3
Electrical Shares								
Aberdare Cables	5/-	12/6		17½	17½	7 0 0	12/6	9/9
Aerialite	1/-	6/6	+3d	45	48	7 7 9	6/6	4/9
Allen, W. H.	£1	47/-		10	10	4 5 0	47/3	33/6
Anglo-Portuguese Tel.	£1	24/3		8	8	6 12 0	27/6	20/6
Aron Elec. Ord.	£1	58/9		15	15	5 2 3	60/-	53/6
Assd. Automation	10/-	22/9	+9d	5	7½	3 6 0	24/9	17/9
Assoc. Elec. Ord.	£1	62/6	+2/6	15	15	4 16 0	73/-	60/-
Automatic Tel. & El.	£1	73/9		15	17	4 12 3	75/-	54/6
Babcock & Wilcox	£1	73/9	+6d	15	15	4 1 3	82/6	70/-
Bakelite	10/-	23/3		16	15	6 9 0	24/6	20/9
Baldwin, H. J.	2/-	4/6		20	20	8 17 9	5/-	3/10½
Berry's Electric	5/-	6/6		—	10	7 13 9	6/6	5/6
British Aluminium	£1	57/6		12	12	4 3 3	71/3	57/6
Brit. Elec. Traction: Def. Ord. "A"	5/-	24/6		22½	25	5 2 0	25/-	17/-
B.I. Callender's	£1	49/3	+6d	12½	12½	5 1 6	55/-	48/3
B.I. Callender's 6% Pref. ...	£1	19/9	−9d	6	6	6 1 6	21/9	19/6
British Tabulating	£1	52/6	+1/3	9	9	3 8 6	56/3	42/-
British Thermostat	5/-	25/-		25	25	5 0 0	27/6	25/-
British Vac. Cleaner	5/-	6/-		15	10	8 6 9	8/-	6/-
Brook Motors	10/-	37/6		25	25	6 13 3	37/6	30/-
Brush Group	5/-	7/9		10	Nil	—	8/-	4/6
Bulgin, A. F.	1/-	5/-		50	40*	8 0 0	5/6	4/6
Burco Dean	5/-	13/-		22½	20	7 13 9	14/-	8/9
Cable & Wireless: Ord.	5/-	12/3	−3d	10	10	4 1 9	12/6	9/6
4% Loan	100	90½		4	4	4 8 6	92½	89
Chloride El. Storage "A" ...	£1	67/6	+1/3	17½	17½	5 3 9	68/9	58/-
Clarke Chapman	£1	162/6		22½	27½	3 7 9	9	6½
Cole, E. K.	5/-	20/3	+6d	17½	17½	4 6 6	23/6	16/6
Cossor, A. C.	5/-	7/-	+3d	Nil	2½	1 15 9	7/3	5/9
Crabtree	10/-	25/6	+6d	20	20	7 16 9	26/-	23/3
Crompton Parkinson Ord. ...	5/-	16/6		16	16	4 17 0	17/9	14/6
De La Rue	5/-	24/9	+3d	30	35	7 1 6	24/9	16/3
Decca "A"	4/-	29/3	+6d	43¾	43¾	5 19 9	32/3	26/10½
Desoutter	5/-	35/6		30	32½	4 11 6	35/6	27/6
Dewhurst	2/-	7/9		30	16½*	4 3 9	7/9	5/9
Dictograph Tel.	2/-	5/6	−3d	20	20	—	6/3	5/6
Dubilier Condenser	1/-	6/3		30	30	4 16 0	7/6	5/6
Duport	5/-	20/9		23	25	6 0 6	21/-	17/6
E.M.I.	10/-	35/3	+1/3	15	15	4 5 0	36/-	23/9
Electrical Components	5/-	8/-		25	12½*	7 16 3	8/-	6/6
Elec. Construction	£1	25/-		8½	8½	6 16 0	27/6	21/9
Elliott Bros.	5/-	28/9		17½	20	3 9 6	33/6	26/3
Enfield Cable Ord.	£1	15/6		Nil	Nil	Nil	21/6	13/-
English Electric	£1	61/3	+1/3	12½	14	4 11 6	65/-	47/6
English Electric 3¾% Pref. ...	£1	12/-		3¾	3¾	6 5 0	14/3	13/-
Ericsson Tel.	5/-	47/6		20†	22†	2 6 3†	50/-	33/3
Ever Ready	5/-	19/-	+3d	35	37½	4 18 9*	20/-	15/-
Falk Stadelmann	£1	38/3		17½	17½	9 3 0	40/6	35/-

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.
* After scrip issue. † Free of income tax. ‡ Dividend indicated.

Automation shares. On a full acceptance of the offers, the issued capital of the holding company would be £3,612,000 (of which £3,112,000 would be ordinary stock). Combined assets come to a total of £5,681,000. For the period August–December of this year, the intention is to pay on the new shares a dividend at the rate of 10 per cent per annum. Present prices of the individual companies' shares indicate a quotation of around 14s for the new shares, and a prospective yield of about 3½ per cent. Closing date of the offer is 1st October (unless it is extended) and the directors of both companies recommend acceptance.

Electrical Investments

Company or Board	Nom. Value	Middle price 2nd Sept.	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield % £ s d	1957 Highest	1957 Lowest
Electrical Shares—continued								
G.E.C. Ord.	£1	46/3		14	12½	5 8 0	58/9	46/3
G.E.C. 6½ Pref.	£1	20/6		6½	6½	6 6 9	23/6	20/6
General Cables	5/-	15/6		30	30	9 13 6	15/6	11/6
Greenwood & Batley	£1	50/-	+2/6	17½	17½	7 0 0	50/-	45/3
Hackbridge Holdings	5/-	14/3		30	20	7 0 3	21/9	14/3
Hackbridge & Hewittic	5/-	13/9		23	20	7 5 6	16/-	13/6
Head Wrightson	£1	135/-	+1/3	20	22½	3 6 9	146/3	112/6
Heatrae	2/-	4/9		15	15	6 6 6	4/9	4/-
Henley's	10/-	14/9		11½	11½	7 16 0	17/-	14/3
Holophane	5/-	23/9		30	30	6 6 3	26/3	17/-
Hoover	5/-	38/9	+1/3	50	50	6 9 0	44/-	24/9
I.C.I.	£1	41/3	−6d	10	10	4 17 0	46/6	37/9
Intl. Combustion	5/-	25/6		20	22½	4 8 3	30/-	20/-
Johnson & Phillips	£1	26/3	−9d	15	10	7 12 6	34/6	26/3
Lancashire Dynamo	£1	40/-		11	11	5 10 0	45/-	36/9
Laurence, Scott	5/-	17/9		15	15	4 4 6	19/9	13/9
Lister, R. A.	£1	30/-		10	10	6 13 3	33/9	26/9
London Elec. Wire	£1	48/3		12½	12½	5 3 9	53/9	43/-
Lucas, J.	£1	33/3		7½	7½	4 10 3	36/6	30/6
Marconi Marine	£1	36/6		10	10	5 9 6	37/-	31/-
Marryat & Scott	2/-	12/6		30	35	5 12 0	13/-	8/-
Mather & Platt	£1	58/9		15	15	5 2 3	63/9	51/3
Metal Industries	£1	28/-	+1/-	Nil	9	6 8 6	30/-	20/3
Midland Elec. Mfg.	£1	52/6		12½	12½	4 15 3	52/6	45/-
Morphy-Richards	4/-	17/6		50	50	4 11 6*	20/-	11/9
Murex	£1	71/3		20	20	5 12 3	79/6	65/-
Newman Ind.	2/-	2/9		10	10	7 5 6	2/9	2/1
Oldham & Son	1/-	3/-	+3d	17½	17½	5 18 9	3/-	2/3
Parnall (Yate)	5/-	7/-		12	12	8 11 6	8/9	5/9
Parsons, C. A.	£1	63/9		10	8⅛*	—	71/3	50/6
Plessey	10/-	75/6	+3/-	27½	30	3 19 6	86/3	61/-
Pye "A" Deferred	5/-	17/6	+1/3	12½	12½	3 11 6	20/-	15/9
Reyrolle	£1	96/-		16½	17½	3 13 0	110/-	90/-
Rheostatic	4/-	9/-		18½	12½*	5 11 0	10/-	8/9
Richardsons Westgarth	5/-	17/9		16⅝	16⅝	4 14 0	20/-	17/-
Scottish Cables	4/-	18/-	+3d	27½	27½	6 2 3	19/3	15/-
Simon-Carves	5/-	32/6	+1/3	28½	20*	3 1 6	36/3	26/-
Smith (England), S.	4/-	15/-		17½	17½	4 13 3	15/9	13/-
Southern Areas	£1	14/6		7½	7½	10 6 9	20/-	13/9
Strand Elec.	5/-	7/3		15	15	10 6 9	8/-	7/3
Sturtevant	5/-	23/3		15†	15†	3 4 6†	27/-	22/9
Sun Elec.	£1	43/9		20	25	11 8 6	43/9	43/9
Switchgear & Cowans	5/-	13/6		25	25	9 5 3	15/6	13/6
Taylor Tunnicliff	5/-	12/9		15	15	5 17 9	13/9	11/9
T.C.C.	10/-	41/3		25	25	6 1 3	41/3	35/-
T.C. & M.	£1	26/-		8½	8½	6 10 9	31/-	24/6
Telephone Mfg.	5/-	5/6		10	10	9 1 9	8/-	5/6
Telephone Rentals	5/-	11/6		12½	12½	5 8 9	12/6	10/3
Thompson (John)	5/-	32/-	−6d	25	25	3 18 3	37/-	29/3
Thorn Elec.	5/-	25/-	+9d	15	17½	3 10 0	26/3	16/3
Thornycroft	£1	26/3	+1/3	15	12½	9 10 6	37/6	25/-
Tube Investments	£1	66/6	+1/6	22½	15*‡	4 10 3	68/9	58/3
Vactric	5/-	20/6	+6d	17½	25	6 2 0	23/9	12/9
Veritys	5/-	9/-		12½	12½	6 19 0	9/3	8/-
Walsall Conduits	4/-	13/3		20	20	6 0 9	15/-	11/-
Ward & Goldstone	5/-	29/-		35	40	3 9 0	29/-	18/6
Watford	2/-	6/6		25	25	7 13 9	6/9	6/3
Westinghouse	£1	37/6		18	9‡	4 16 0	41/3	36/-
West, Allen	5/-	11/9		15	15	—	13/6	9/6
Wolf Electric	5/-	11/-		20	20	4 10 9*	13/9	8/9

A. C. Cossor

In announcing a profit of £190,000 (before tax) for the year ended last March, A. C. Cossor more than fulfilled market expectations of a considerable improvement on the results of the previous year, when there was a loss of £120,000 and no dividend for the ordinary shareholders. Most of the latest profit is being retained in the business, but the shares come back into the dividend list with a payment of 2½ per cent. In 1954–5, the best of recent years, there was a 15 per cent distribution. Following the announcement the price of the 5s shares was marked up to 7s. In advance of the full report, the recovery was assumed to have been based mainly on better radio and television business, but the chairman's review is awaited with interest also for its comments on progress in the group's relatively new activities in the fields of electronic instruments and telecommunications.

Thorn Report

Thorn Electrical Industries 5s shares remained well supported after the appearance of the full annual report, in which Mr. Jules Thorn reviews a year of further substantial progress despite the handicaps imposed by Government restrictions on the radio and television sides of the business during the period. The accounts show that the increase in the dividend from 15 to 17½ per cent is accommodated very comfortably by the improvement of more than 20 per cent in the trading profit. In the balance-sheet, which records the further large growth of fixed assets, the size of the outstanding capital commitments, and of the loan items, was read in the market as a possible pointer to another issue of permanent capital sooner or later. In general the report was regarded as providing strong justification for the quotation of the shares on a yield basis much below the average for industrial shares. The return on the 5s shares at 25s is 3½ per cent.

Canadian Stocks

A sharp reverse in the Wall Street market over the past month or two has brought down heavily the price of many of the Canadian stocks which stood in high favour in the earlier part of the year. These falls have taken place despite a rise to about 17 per cent in the premium at which dollar stocks are currently quoted in London. British Columbia Power common shares have fallen from a top price of $115 to under $100; Shawinigan Power from $204 to $180; and Power Corporation of Canada from $175 to $135. Yields on shares such as these are still well below 3 per cent, witnessing a persistence of strong confidence in the long-term investment prospects of the Canadian power industries.

REPORTS and DIVIDENDS

Associated Electrical Industries, Ltd., has announced the financial results of the group for the six months ended 30th June last. The trading profit was £6·76 million as compared with £7·32 million for the corresponding period of 1956, and after deducting £1·76 million for depreciation, the net balance, before taxation, was £5 million (against £5·93 million). For the purpose of comparison, the profit figures for the first half of 1956 have been adjusted by adding back the amount then allocated to reserve for increased replacement cost of fixed assets. The value of output for the six months was £67·9 million (£61·2 million), and the value of orders received £84·5 million (£66·9 million). A second interim ordinary dividend of 2½ per cent (unchanged) is announced. It is stated that the engineering strike, which checked the rise in production and which involved the company in substantial losses, was settled in April last. In the following three months output continued to rise and profits improved.

Thorn Electrical Industries, Ltd.—The report and accounts for the year to 31st March last now published confirm the preliminary figures given in our issue of 16th August.

The past year marked the 21st anniversary of the formation of the company as a public company, and in a message to shareholders Mr. Jules Thorn (chairman) says that a bold policy of research, investment in up-to-date equipment and commercial enterprise has brought progress in the fields of radio, television, lighting and domestic equipment which in a relatively short time has placed the company in a position of leadership.

In his circulated review of the group's activities during the past year Mr. Thorn says, after referring to the leading position in the industry of Ferguson receivers, that this autumn the Enfield factory will be producing its one-millionth television set. Since the end of the financial year arrangements have been concluded between E.M.I. and themselves under which they now also control "His Master's Voice" and Marconiphone radio and television. The lighting division has grown during the last few years to such a size that the board decided to concentrate the whole of the lighting activities into a fully owned subsidiary known as Atlas Lighting, Ltd.; the division has achieved a record turnover, and has further enhanced its status. He is convinced of the excellent prospects in the lighting field, particularly in fluorescent lighting. In the United Kingdom, however, the acceptance of fluorescent lighting has not been as rapid as in some European countries and they still have a tremendous potential before them. For this reason they continue to devote a considerable proportion of their research activities to the development of new and improved types of tubes, fittings and other lighting equipment; they produce more fluorescent lamps than the rest of the industry combined. In the incandescent field they have made a major step forward in the quality of their lamps by the introduction of electronic testing of every individual lamp during the process of manufacture, which virtually eliminates the possibility of a faulty lamp leaving the factory. The factory at Spennymoor which manufactures fluorescent fittings and control gear has been further expanded. In street lighting good progress is being made. Mr. Thorn acknowledges the substantial contribution Ekco-Ensign Electric, Ltd., has made to their results in the lighting field.

He says that the expansion of their overseas trade continues and despite increasing competition export sales during the year have again exceeded all earlier achievements. The overseas factories continue to make progress and, in addition to the lighting products which have for some time been manufactured by them in South Africa, New Zealand and Australia, television receivers are now being assembled in Melbourne. The retail prices of all incandescent lamps have remained unaltered for some years in spite of increasing material costs, wages and salary increases, higher fuel prices and rising transport charges. Increased efficiency in production and large capital investment in high-speed equipment have helped them to offset these higher costs, but it is impossible for them to continue to carry this burden which is making serious inroads into their profit margins.

They have added a popular-priced three-plate cooker (the "Viscount") to their "Tricity" range, and the manner in which it has been received by the Electricity Boards and the trade has encouraged them to expand their production facilities.

Parmiter, Hope & Sugden, Ltd.—In the course of his speech at the annual meeting held on 28th August, Mr. E. W. Sugden (chairman and managing director) said that the improvement in turnover which was evident at the time of his last review was continued during the latter part of the year and a new record was attained, being about 10 per cent above the previous best. Referring to rising prices, Mr. Sugden said that they were able for a period following the numerous price advances which occurred after the war to absorb a proportion of the increasing costs by improved production, but this was no longer the case; price advances were now the inevitable consequence of wage increases.

In regard to prospects for the current year, production had been satisfactory, having continued to increase in volume, helped by an excellent stock position at the commencement of the year. Developments were mainly confined to consolidating and improving the production of recent designs. A noteworthy example of this had been the development of the "Aeroflex" fuse to comply with the technical requirements of the Canadian Standards Association. The production and marketing of a complete range of these fuses for sale in the Dominion had made a very promising commencement.

James Howden & Co., Ltd., report group profits for the year ended 30th April last of £1,124,820, as compared with £1,063,674 for the preceding year, to which is added £128,042 brought in, making £1,252,862. From this is deducted taxation of £562,232, a sum of £158,152 dealt with in the accounts of subsidiaries, and £300,000 placed to general reserve. The dividend for the year is maintained at 25 per cent by a final payment of 20 per cent. The balance carried forward in the parent company's accounts is £75,503.

Underwriting has been completed for the issue to ordinary shareholders of 546,000 10s ordinary shares at 40s per share on the basis of one-for-four.

The Chloride Electrical Storage Co., Ltd., has declared an interim dividend of 5 per cent (unchanged).

International Combustion (Holdings), Ltd., has declared an interim dividend of 7½ per cent (unchanged).

Increases of Capital

Siemens Brothers & Co., Ltd.—Increased by £1,750,000, in £1 ordinary shares, beyond the registered capital of £5,250,000.

Bowthorpe Holdings, Ltd.—Increased by £300,000, in 2s ordinary shares, beyond the registered capital of £350,000.

Ozonair Engineering Co., Ltd.—Increased by £10,000 in 2s ordinary shares, beyond the registered capital of £40,000.

Bankruptcies

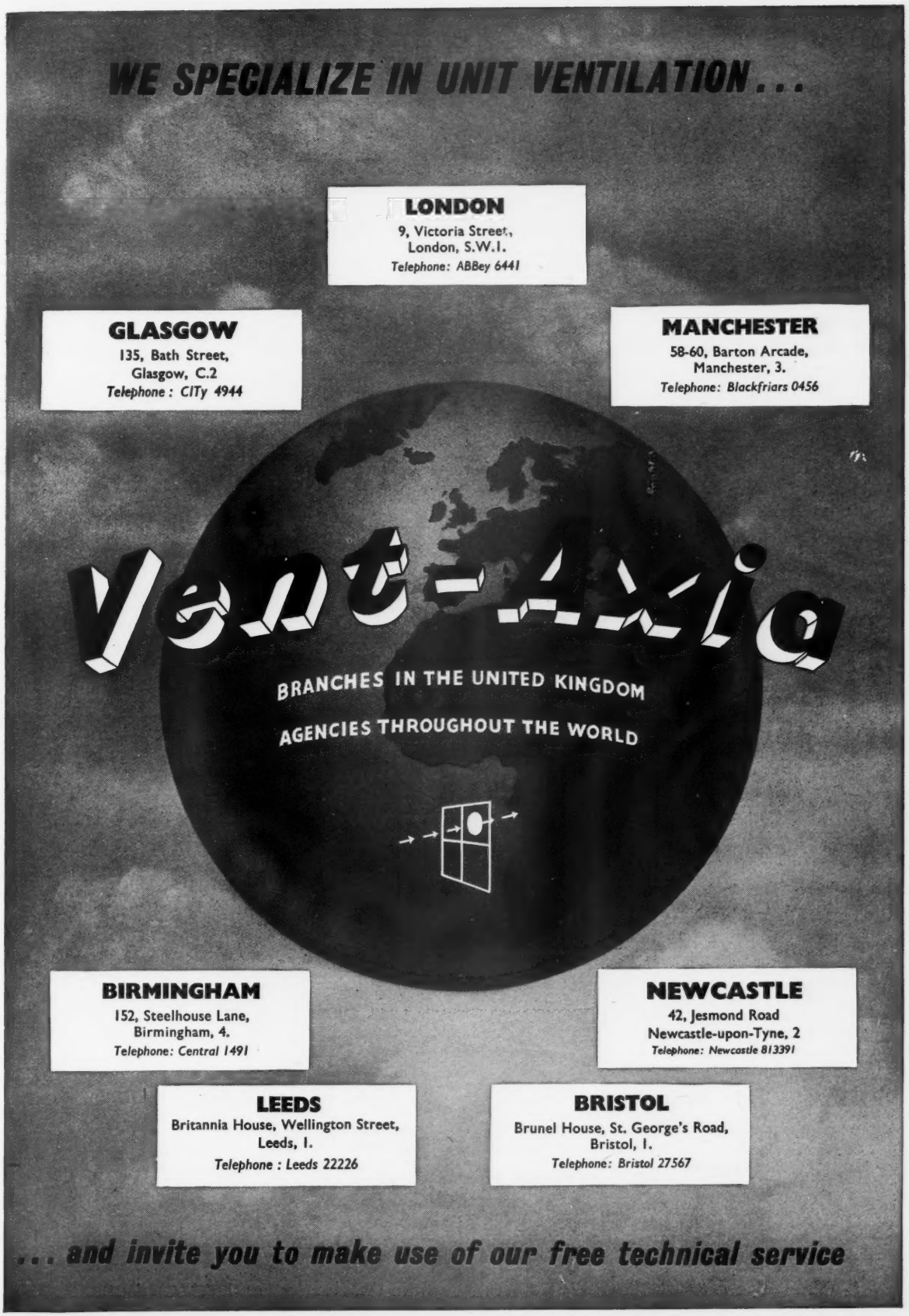
J. E. Rippin, Egglestones Yard, Sherwood Avenue, Newark-on-Trent, Notts, electrical engineer.—Last day for receiving proofs for dividend 7th September. Trustee, Mr. E. C. Stimpson, 27, Regent Street, Park Row, Nottingham, Official Receiver.

R. H. Henley (trading as Green & Henley), 92, Hersham Road, Hersham, Walton-on-Thames, sued as R. H. Henley, lately carrying on business at 79, High Street, Walton-on-Thames, export merchant (electrical goods).—Last day for receiving proofs for dividend 10th September. Trustee, Mr. C. T. Newman, 58-61, York Terrace, Regent's Park, London, N.W1, Official Receiver.

D. E. J. Daniels, lately carrying on business at 27, New Street, Worcester, under the name of Douglas Electrical Repair Co., as an electrical engineer.—First and final dividend of 7d in the £, payable on and after 20th September at the Official Receiver's office, Somerset House, 37, Temple Street, Birmingham, 2.

V. F. Pitt, electrical engineer, 54, Mortimer Street, Herne Bay, Kent.—First and final dividend of 9d in the £, payable at the offices of A. E. Orbell & Co., 7, Old Steine, Brighton, 1.

H. C. Kinsley, 20, Waterloo Street, Market Rasen, Lincs, electrical engineer.—Public examination 6th November at the Guildhall, Stonebow, Lincoln.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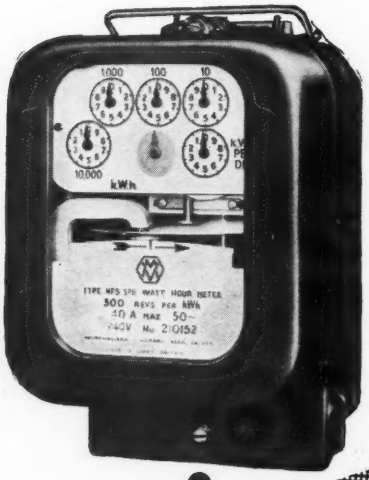

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NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) will be obtainable after 11th September from the Patent Office, 25 Southampton Buildings, London, W.C.2.

1953

32303. Staatsbedrijf der Posterijen Telegrafie en Telefonie.—Magnetic modulator. 20th November, 1953. (782737.)

32779. Standard Telephones & Cables, Ltd.—Electrical circuits using multi-gap cold cathode gas-filled glow discharge tubes. 19th November, 1954. (Cognate application 8108, 19th March, 1954.) (Addition to 692415.) (782669.)

1954

2705. National Research Development Corporation.—Controlled electric heating apparatus. 27th January, 1955. (782566.)

3983. Electric & Musical Industries, Ltd. —Electrical circuits. 8th February, 1955. (782739.)

5785. Cooper-Stewart Engineering Co., Ltd., and Robson, C. W.—Control circuits for electrified wire fences. 4th February, 1955. (782568.)

6289. Hunt (Capacitors), Ltd., A. H.—Electrolytic capacitors. 1st March, 1955. (782672.)

7469. British Thomson-Houston Co., Ltd.—Induction heating apparatus. 6th June, 1955. (782825.)

8119. General Electric Co., Ltd., and Allard, L. S.—Cathode-ray tubes incorporating ion trap arrangements. 8th March, 1955. (782673.)

10115. Elliott Bros. (London), Ltd.—Electrical devices. 6th April, 1955. (782740.)

11911. Telefunken Ges.—Magnetron valves. 26th April, 1954. (782741.)

19743. Marconi's Wireless Telegraph Co., Ltd.—Circuit arrangements for improving signal/noise ratio in radio receivers for very high frequency pulsed signals. 29th June, 1955. (782683.)

20050. Associated Electrical Industries, Ltd.—Apparatus for measuring small movements. 6th July, 1955. (782831.)

20451. Westinghouse Brake & Signal Co., Ltd., Walker, A. H. B., and King, K. G.—Voltage-current regulators. 29th June, 1955. (782684.)

21284. British Thomson-Houston Co., Ltd.—Electron discharge devices for generating electrical oscillations. 28th June, 1955. (782573.)

26475. Westinghouse Brake & Signal Co., Ltd., Walker, A. H. B., and Cole, L. A.—Jig for making contact with the electrodes of a dry contact rectifier. 20th July, 1955. (782834.)

27303. General Electric Co., Ltd.—Heat exchangers. 9th September, 1955. (782577.)

27427. British Thomson-Houston Co., Ltd.—Ultra high frequency waveguide systems. 20th September, 1955. (Cognate application 1804, 20th January, 1955.) (782748.)

29913. Cinema-Television, Ltd.—Cathode-ray tubes. 16th November, 1955. (782835.)

32047. Standard Coil Products Co., Inc. —Combination frequency selector. 5th November, 1954. (782839.)

33137. Central Electricity Authority, Barton Conduits, Ltd., and Ellis, R.—Magnetic separators. 14th November, 1955. (782840.)

34064. Cinema-Television, Ltd.—Gating circuits for electrical signals. 23rd November, 1955. (782749.)

34668. General Electric Co., Ltd.—Gas purity detectors. 21st November, 1955. (782517.)

35336. Electric & Musical Industries, Ltd.—Magnetic data storage systems. 5th December, 1955. (782582.)

37371/3. Horstmann Gear Co., Ltd.—Electric time switches. 28th December, 1955. (782659/61.)

1955

83. Krizik-Karlin, Vyvojovy Zavod, Narodni Podnik, Tomanek, E., and Müller, K.—Arrangement for the control of drives with several motors. 3rd January, 1955. (782696.)

2101. Allis-Chalmers Manufacturing Co. —Electric circuit interrupter. 24th January, 1955. (782497.)

2378. General Electric Co.—Electric switches and operating mechanisms therefor. 26th January, 1955. (782521.)

4064. Thorn Electrical Industries, Ltd.—Electric discharge tube circuits. 10th February, 1956. (782854.)

5067. Chloride Electrical Storage Co., Ltd.—Containers for accumulator cells. 15th February, 1956. (782524.)

6454. Western Electric Co., Inc.—Methods of making semi-conductive bodies. 4th March, 1955. (782662.)

6455. Western Electric Co., Inc.—Solar energy converting apparatus. 4th March, 1955. (782663.)

6456. Western Electric Co., Inc.—Semiconductive rectifying bodies. 4th March, 1955. (782664.)

6457. Western Electric Co., Inc.—Protecting devices for telephone apparatus. 4th March, 1955. (782665.)

9090. Licencia Talalmanyokat Ertekesito Vallalat.—Safety device for the protection of the stability of turbo-alternators operating in parallel connection against excessive rotational speeds and runaways. 29th March, 1955. (782704.)

9341. Decca Record Co., Ltd.—Protective circuits. 22nd November, 1955. (782596.)

11563. Collins Radio Co.—Remote signalling system. 21st April, 1955. (782706.)

13510. Siemens & Halske Akt.-Ges.—Travelling wave tubes. 10th May, 1955. (782768.)

15060. Pirelli-General Cable Works, Ltd. —Metal sheathed electric cables. 20th April, 1956. (782535.)

15075. Western Electric Co., Inc.—Methods of treating semi-conductor bodies. 25th May, 1955. (782863.)

15194. Mallory & Co., Inc., P. R.—Tantalum electrolytic capacitor. 26th May, 1955. (782818.) 19415. Electrolytic capacitor. 5th July, 1955. (782819.)

16797. General Electric Co.—Mechanical contact rectifiers. 10th June, 1955. (782770.)

18218. General Electric Co.—Securing of connections to semi-conductor devices. 23rd June, 1955. (782771.)

18965. General Electric Co.—Manufacture of cathode-ray tubes. 30th June, 1955. (782713.)

19636. Hazeltine Corporation.—Colour image reproducing apparatus. 7th July, 1955. (782868.)

19728. Bendix Aviation Corporation.—Deflection circuit for repetitively sweeping the beam of a cathode-ray tube. 7th July, 1955. (782772.)

21629. Siemens-Schuckertwerke Akt.-Ges.—Resistance devices for generating a Hall voltage. 26th July, 1955. (782774.)

21992. Zenith Radio Corporation.—Apparatus for colour television and cathode-ray tubes for use therein. 29th July, 1955. (782870.)

22643. General Electric Co.—Heat responsive electric switch devices. 5th August, 1955. (782871.)

24143. Akt.-Ges. Brown, Boveri & Cie.—Regulation of d.c. motors. 22nd August, 1955. (782776.)

25414. Philips Electrical Industries, Ltd. —Electronic switches employing junction transistors. 5th September, 1955. (782780.)

26078. Siemens-Reiniger-Werke Akt.-Ges.—Supersonic wave impulse cardiographs. 12th September, 1955. (782547.)

26616. Collins Radio Co.—Electro-mechanical filters. 16th September, 1955. (782685.)

26786. Janszen, A. A.—Electrostatic transducer. 19th September, 1955. (782549.)

26873. Automatic Electric Laboratories, Inc.—Telephone desk set. 20th September, 1955. (782613.)

27200. Western Electric Co., Inc.—Telephone systems. 23rd September, 1955. (782875.)

28821. Muirhead & Co., Ltd.—Miniature rotating electrical machines. 25th January, 1956. (782551.)

29057. Soc. Francaise Radio-Electrique. —Automatically controlled variable frequency oscillators. 12th October, 1955. (782878.)

31186. Kodak, Ltd.—Timing mechanism for the operation of an electric circuit or circuits. 1st November, 1955. (782554.)

33881. Max-Planck-Ges. zur Forderung der Wissenschaften, E. V.—Electronic calculating and similar machines. 25th November, 1955. (782618.)

34842. Piles Wonder.—Electric battery with flat cells. 5th December, 1955. (Addition to 774151.) (782619.)

36518. Allen, A. A.—Snap-action electric switches. 20th December, 1955. (782880.)

37444. General Electric Co.—Noise reduction applicable to electric induction apparatus and other sound sources. 30th December, 1955. (782794.)

1956

187. Bendix Aviation Corporation.—Thermal safety plug. 3rd January, 1956. (782559.)

640. Sihn, W.—Electrical plugs. 9th January, 1956. (782796.)

7606. Westinghouse Electric International Co.—Electric motor control systems. 12th March, 1956. (782645.)

7616. Electrolux Corporation.—Vacuum cleaners. 12th March, 1956. (782805.)

7797. Allis-Chalmers Manufacturing Co. —Electric circuit interrupter. 24th January, 1955. (Divided out of 782497.) (782498.)

8614. Mollerhoj, J. S.—Electric power cables. 20th March, 1956. (782648.)

9941. Standard Telephones & Cables, Ltd.—Receivers for electric carrier communication systems. 29th March, 1956. (782650.)

14771. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler.—Nuclear reactors. 11th May, 1956. (782888.)

16975. General Motors Corporation.—Centrifugal governor controlled electric switches. 1st June, 1956. (782889.)

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CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Australia.—State Electricity Commission of Victoria. 27th November. One 2,000 kW water driven turbo-generator and accessory plant for Cairn Curran power station. (See this issue.)

Sydney County Council. 19th September. One 85 kW glass bulb mercury arc rectifier unit. (E.S.B. 20577/57. Ten/27682.)*

Melbourne and Metropolitan Tramways Board. 1st October. Supervisory control equipment. (E.S.B. 20472/57. Ten/27712.)*

Department of Railways, New South Wales Branch, Sydney. 2nd October. One 4,000 kW rectifier unit for 1,500 V railway traction. (E.S.B. 20891/57. Ten/27707.)*

Metropolitan Water Sewerage and Drainage Board, Sydney. 8th October. Two motor driven effluent pumping units. (E.S.B. 20870/57. Ten/27709.)*

Ayr.—County Council. Contractors wishing to tender for the installation of trunk road lighting should notify the county engineer. (See this issue.)

Burma.—Union of Burma Purchase Board, Rangoon. 16th September. Submersible electric pump. (E.S.B. 21242/57. Ten/27756.)* 19th September. Voltmeters and insulation testers. (E.S.B. 21245/57. Ten/27757.)*

Canada. — Winnipeg Hydro-Electric System. 16th September. 5 kV metalclad switchgear. (E.S.B. 21116/57. Ten/27740.)*

Manitoba Hydro-Electric Board. Power transformers. (E.S.B. 21118/57. Ten/27760.)*

Ceylon.—Department of Government Electrical Undertakings, Colombo. 18th September. Five l.v. main control switchboards. (E.S.B. 20531/57. Ten/27648.)*

Dagenham. — Corporation. Contractors wishing to be placed on the approved list of firms to tender for various works in connection with school maintenance, including electrical work, should apply by 30th September. (See this issue.)

Formosa.—Central Trust of China, Taipei. 30th September. Two 100 h.p. and four 60 h.p. motors. (E.S.B 20936/57.I.C.A. Ten/27699.)* 1st October. Mining cable, electric draw furnace and substation equipment. (E.S.B. 20937/57. Ten/27698.)* Two 75 h.p. electric motors. (E.S.B. 20934/57. I.C.A. Ten/27716.)* Power supply equipment, including power transformer, feeder panels, wall bushing and power cable. (E.S.B. 20939/57.I.C.A. Ten/27715.)*

Harlow.—U.D.C. 16th September. Street lighting equipment. A. W. R. Webb, surveyor, Netteswell Hall.

India.—Damodar Valley Corporation. 24th September. Circuit-breakers and transformers. (See this issue.)

New Zealand.—Wellington City Electricity Department. 3rd October. Twelve automatic l.v. voltage regulators. (E.S.B. 20798/57. Ten/27666.)*

Christchurch Electricity Department. 24th September. Ten miles of p.v.c. insulated aerial cable. (E.S.B. 20678/57. Ten/27647.)*

South Africa.—Stores Department, South African Railways, Johannesburg. 25th September. Conduit. (E.S.B. 20733/57. Ten/27708.)* 27th September. Telegraph line material. (E.S.B. 21044/57. Ten/27729.)*

Union Tender and Supplies Board, Pretoria. Copper and bronze sleeves for jointing live wire. (E.S.B. 20964/57. Ten/27730.)*

Tain.—Corporation. 26th September. Street lighting equipment. (See this issue.)

United States.—Power Authority of the State of New York. 1st October. 28,000 h.p. hydraulic pump/turbines for the Tuscarora plant. (E.S.B. 20138/57. Ten/27656.)*

* Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

ORDERS PLACED

Barrow-in-Furness.—Re-wiring of Alfred Barrow County Secondary School for Girls (£1,997).—Dalton Radio.

Birmingham.—Regional Hospital Board. Recommended. Re-wiring of the female wards at All Saints' Hospital, Winson Green (£7,257).—Thompson Electrical Co.

Hartlepool.—Corporation. Electrical installations in 118 new houses at King Oswy Drive (£2,498).—E. Dixon Barker & Son.

Hereford.—City Council. Recommended. Installation of group "B" lighting in various roads (£4,184).—A.E.I. Lamp & Lighting Co.

Ipswich.—Paving and Lighting Committee. Recommended. Sodium street lighting (£5,024).—G.E.C.

Peterborough. — Highways Committee. Recommended. Group "B" lighting in various roads in the city (£11,611).—G.E.C.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Atherstone.—War memorial hall (£40,000); H. Jepson & Partners, architects, Newdegate Place, Nuneaton.

Bangor.—Extensions at Caernarvon and Anglesey General Hospital (£261,000); Leyland Construction Co., Ltd., Leyland, Lancs.

Bath.—First stage of Technical College; Brandt & O'Dell, electrical consultants, 12, Queen Anne Street, London, W.1.

First phase of scheme for 500 houses and shops, etc.; J. White, Builders, Ltd., Bristol (40 houses); E. Mortimer & Son, Ltd., Bath (59 houses).

Billingham-on-Tees. — Houses (105); U.D.C. surveyor.

Birmingham.—Erection of premises including seven-storey offices, Weaman Street/Inner Ring Road site (£500,000); Stewarts & Lloyds, Ltd., Broad Street Chambers, Birmingham.

Extensions to Handsworth Technical College; Norrish & Stainton, architects, 13, Cambridge Crescent.

Colwyn Bay.—Five laboratories and library at Grammar School (£50,000); Denbighshire county architect, Grove Park, Wrexham.

Dagenham Dock. — Switch-house and offices; Samuel Williams & Sons, Ltd., Dock Road.

Darlington.—Factory, McMullen Road; Clayton & Deas, architects, High Row Chambers.

New St. Mark's Church; R. Blackett & Son, builders, Bondgate, Darlington.

Houses (54), Skerne Park estate; borough architect, Central Buildings.

Deal.—Fire station, London Road; E. T. Ashley Smith, county architect, Springfield, Maidstone.

Dewsbury.—Factory and depot; Chas. Roberts & Co., Ltd., Railway Wagon Works, Horbury Junction, Wakefield.

Dorking and Horley.—Houses (100), Beare Green, as first phase of larger scheme; clerk, Brookmead, Dorking.

Dudley.—Branch library, Dudley Wood; borough architect.

Dunfermline.—Houses (33); burgh architect, 6, Abbot Street.

Durham.—Houses (25), Newton Hall estate; L. E. Ellis, city engineer, Town Hall.

Hants.—Library at Totton, and fire station at Whitchurch; county architect, The Castle, Winchester.

Hatfield.—Health centre (£23,500); C. H. Aslin, Herts. county architect, County Hall, Hertford.

Holmfirth.—Houses (41), Kirkroyds estate; P. N. Brown & Son, Market Place, Honley.

Hook.—Branch library, Elm Road; Clifford E. Culpin, architect, 39, Doughty Street, London, W.C.1.

Leeds.—Houses (500), Armley Heights estate; city architect, Priestley House, Quarry Hill, 9.

London.—Office block, 18/20, Ironmonger Lane, E.C.; Messrs. Clutton, architects, 5, Great College Street, S.W.1.

Office block, Pall Mall and Haymarket; Franklin & Andrews, surveyors, 173, Fleet Street, E.C.4.

New operating theatre at Dulwich Hospital, S.E.22; Sir William Baird & Partners, surveyors to Regional Hospital Board, 7, Catherine Place, London, S.W.1.

Luton.—Flats (108), Whipperley Ring; borough architect.

Middlesbrough.—Houses (90), Easterside, and 12 three-storey flats at St. Hilda's; J. A. Kenyon, borough engineer.

Morpeth.—Houses (150), Pegswood, for R.D.C.; J. R. Miles, surveyor, Dacre Street.

Houses (70), Spelvit Lane; F. K. Perkins, borough engineer, 36, Bridge Street.

Newcastle-on-Tyne.—Multi-storey garage, Picton Terrace for Strakers (Newcastle), Ltd.; P. L. Browne, Son & Harding, architects, Pearl Buildings, Newcastle.

Five-storey block of premises, Church Street; city architect, 18, Cloth Market, Newcastle.

R.C. secondary modern school at Kenton; Reavell & Cahill, architects, Lloyds Bank Chambers, Alnwick.

Works additions, Barrack Road, for J. Taylor Dunford & Co., Ltd.; Cackett, Burns Dick & Mackellar, architects, 21 Ellison Place, Newcastle.

Offices, Scotswood Road, for Adamsez, Ltd.; W. Dixon & Son, architects, 1, Collingwood Street, Newcastle-on-Tyne.

Northallerton.—Houses and flats (44), Forest Road, for U.D.C.; Brierley, Syme & Leckenby, architects, 10, Lendal, York.

North Shields.—Warehouse, bacon factory and office, West Chirton, Hadrian Supply Co.; C. Solomon, St. Mary's Place, Newcastle.

Factory and office block, Wallsend Road; Stella Products, Ltd.

Poole.—Flats (48), Poole Road; Dor Properties, Ltd., Cheam House, Exeter Road, Bournemouth.

Watford.—Works extensions, Nascot Road; Sun Printers, Ltd., Whippendell Road.

Yeovil.—Dwellings (45), Sunningdale estate; borough surveyor.

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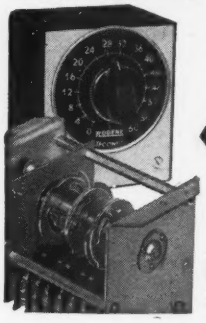

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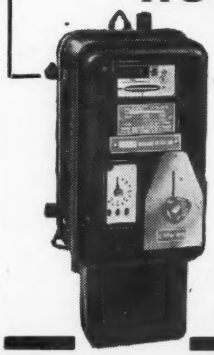

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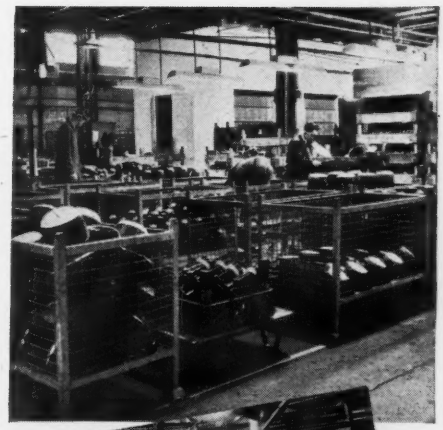

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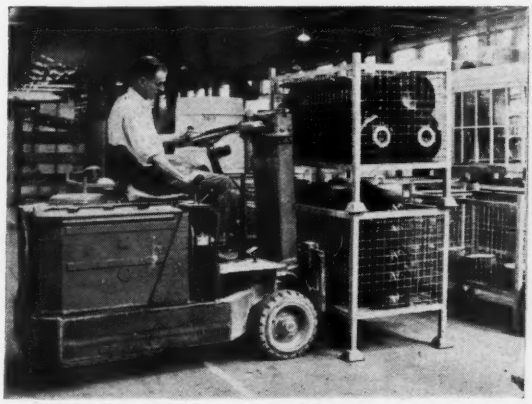

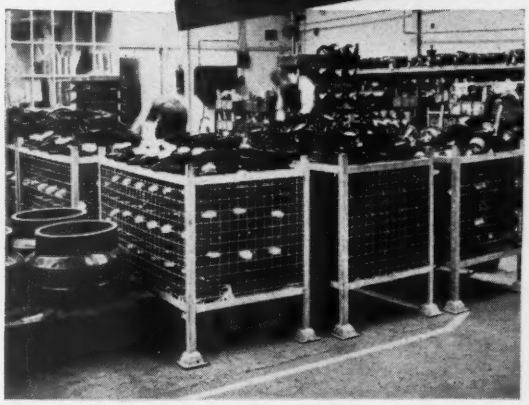

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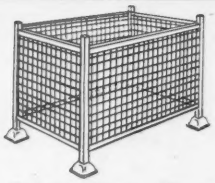

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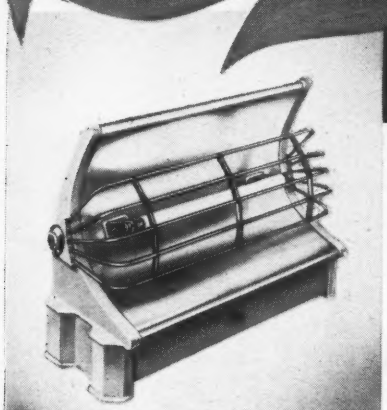

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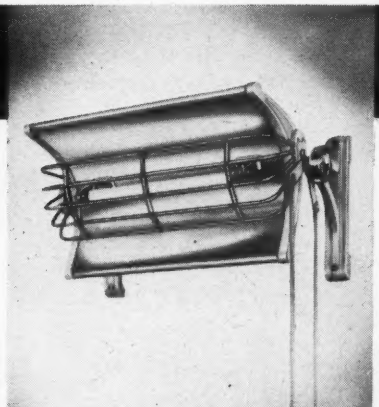

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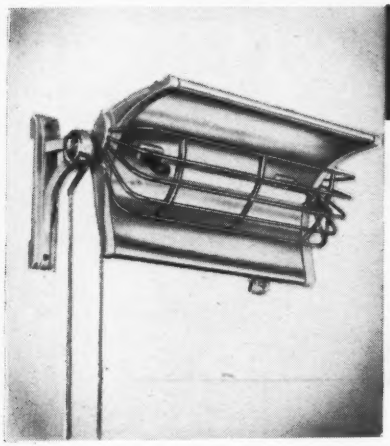

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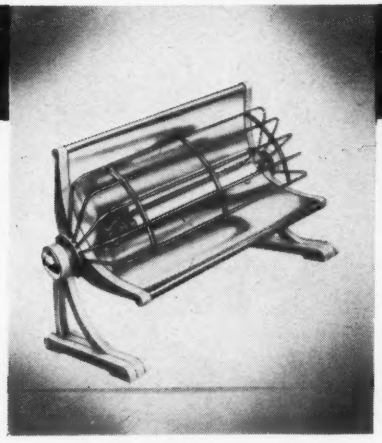

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TWIN BAR ADJUSTABLE FIRE

1,500 WATT

RETAILS AT

52'6

Plus 22/9 Tax

Over a million sold!

"Sunny Heat" WINTER!

Terrific value plus powerful publicity will drive customers to you or your competitor and it might just as well be you.
Think of it! A solid cast frame with tilt adjustment, beautifully made and packed, with a guarantee, for only **45/-** retail (plus tax) and others in proportion. We're telling over 30 million people about it in the press.

SHOW THEM!
SELL THEM!!

Come over to the "Sunny" side!

Full wholesale and retail terms, free delivery, plenty of attractive literature and other publicity matter. Just drop us a card to-day for details.

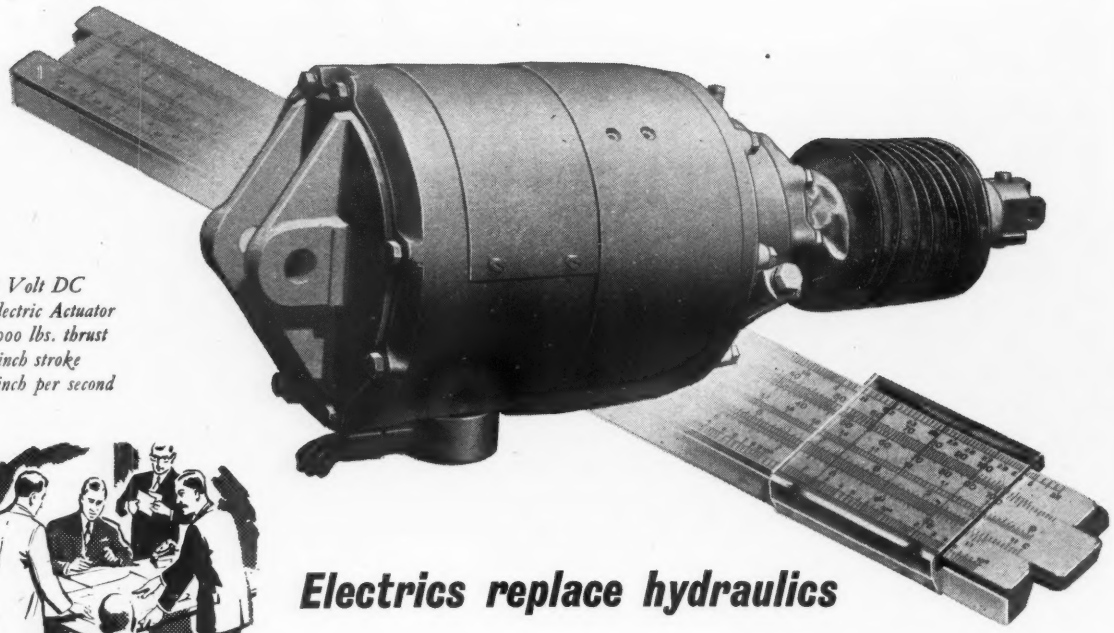
THE CARLTON
ADJUSTABLE 1KW
RADIANT FIRE
RETAILS AT
45/-
Plus 19/6 Tax

MANUFACTURED BY

FORMO LTD., BROMLEY, KENT

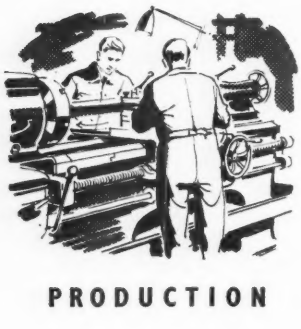
ONE OF THE GRAHAM FARISH GROUP

They gave us a problem . . .



48 Volt DC
Electric Actuator
5,000 lbs. thrust
7 inch stroke
1 inch per second

CONSULTATION



PRODUCTION

Electrics replace hydraulics

We were asked to design and develop a vehicle for handling aircraft, incorporating a lifting and lowering mechanism, using electric power in preference to hydraulics.

To do this we developed an entirely new type of Linear Actuator, having a maximum thrust of 5,000 lbs., maximum stroke of 7″ and a rate of extension of 1″ per second. After successful service trials the unit was adopted for full-scale operational use.

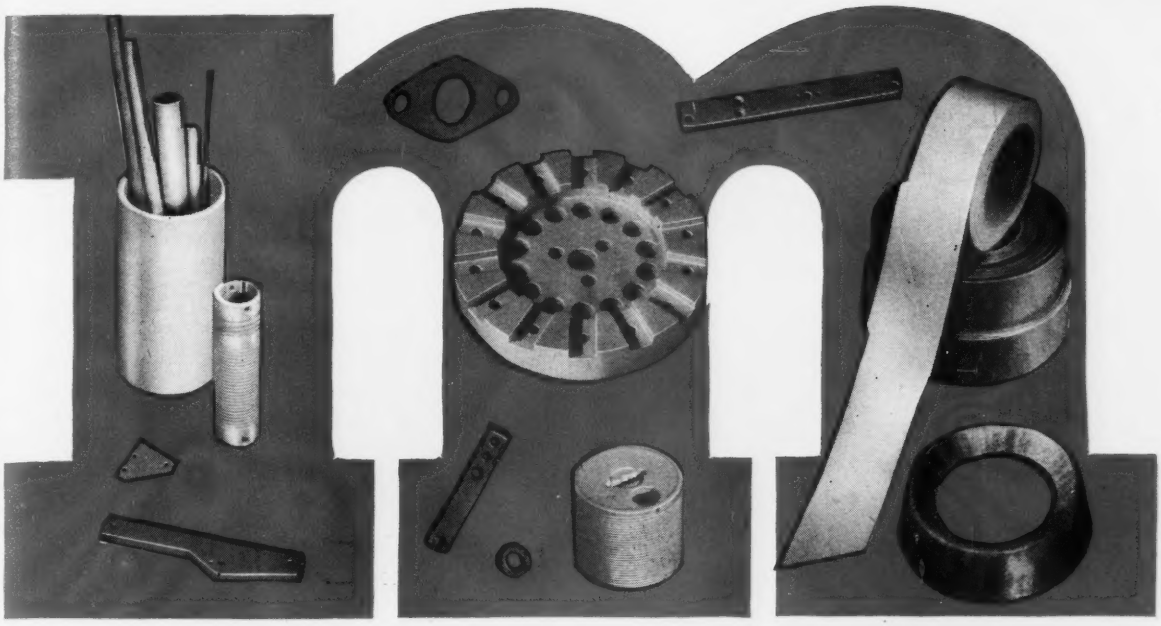
ACTUATORS

We are now developing a range of Industrial Actuators to suit many new applications where all-electric control has particular advantages.

We welcome enquiries for any type of special-purpose rotating electrical equipment.

VERNONS INDUSTRIES LIMITED

KIRKBY INDUSTRIAL ESTATE, KIRKBY, LIVERPOOL · Tel. SIMonswood 3261



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SILICONE INSULATION

is another of those things that M and I make superbly well

Silicone bonded Micanite in sheets both hard and flexible, V-rings and tubes.

Silicone glass and glass/mica sheets and tapes.

Silicone bonded glass laminates in the form of blocks, sheets, tubes, cylinders and machined parts.

Silicone elastomer tapes—

ALL CLASS 'H' B.S.2757.

Other M & I products.

"PAXOLIN" SYNTHETIC RESIN BONDED LAMINATES.

"PANILAX" ANILINE FORMALDEHYDE RESIN MOULDINGS.

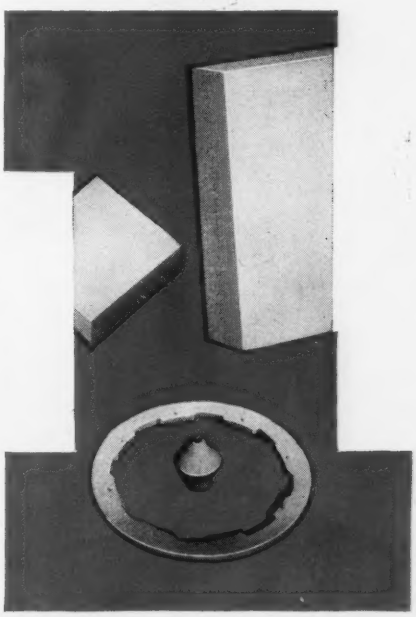
MICA BLOCK, INCLUDING FABRICATED PARTS AND SPLITTINGS.

MICANITE (BUILT-UP MICA), OF EVERY TYPE.

EMPIRE VARNISHED INSULATION INCLUDING PAPER, COTTON, SILK, GLASS, NYLON AND TERYLENE.

HIGH VOLTAGE BUSHINGS AND TERMINALS.

SUNDRY INSULATING MATERIALS.



"Paxolin" and "Panilax" are registered trade names of The Micanite & Insulators Co., Ltd.

m and i

The Electrical Insulation People

THE MICANITE & INSULATORS CO., LTD.,

WALTHAMSTOW, LONDON, E.17. TELEPHONE: LARKSWOOD 5500. TELEGRAMS: "MYTILITE", EASPHONE, LONDON.

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Cryselco – at your service everywhere

LEICESTER DE MONTFORT HALL In town or country, wherever you are, CRYSELCO'S national coverage ensures for you the best quality and prompt service for all your lamp and fittings requirements. There are branches waiting to serve you in fourteen towns and cities. Please write or telephone.

OVER SIXTY YEARS OF QUALITY AND SERVICE

CRYSELCO

MADE IN ENGLAND

Lamps FOR ALL PURPOSES

OUR ILLUMINATING ENGINEERING DEPARTMENT
IS AVAILABLE TO GIVE CUSTOMERS PROMPT HELP AND SERVICE

Branches BIRMINGHAM · BRISTOL · BURY ST EDMUNDS · CARDIFF · GLASGOW · LEEDS
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QUALITY The foundation of CRYSELCO SALES

CRYSELCO LIMITED KEMPSTON WORKS BEDFORD

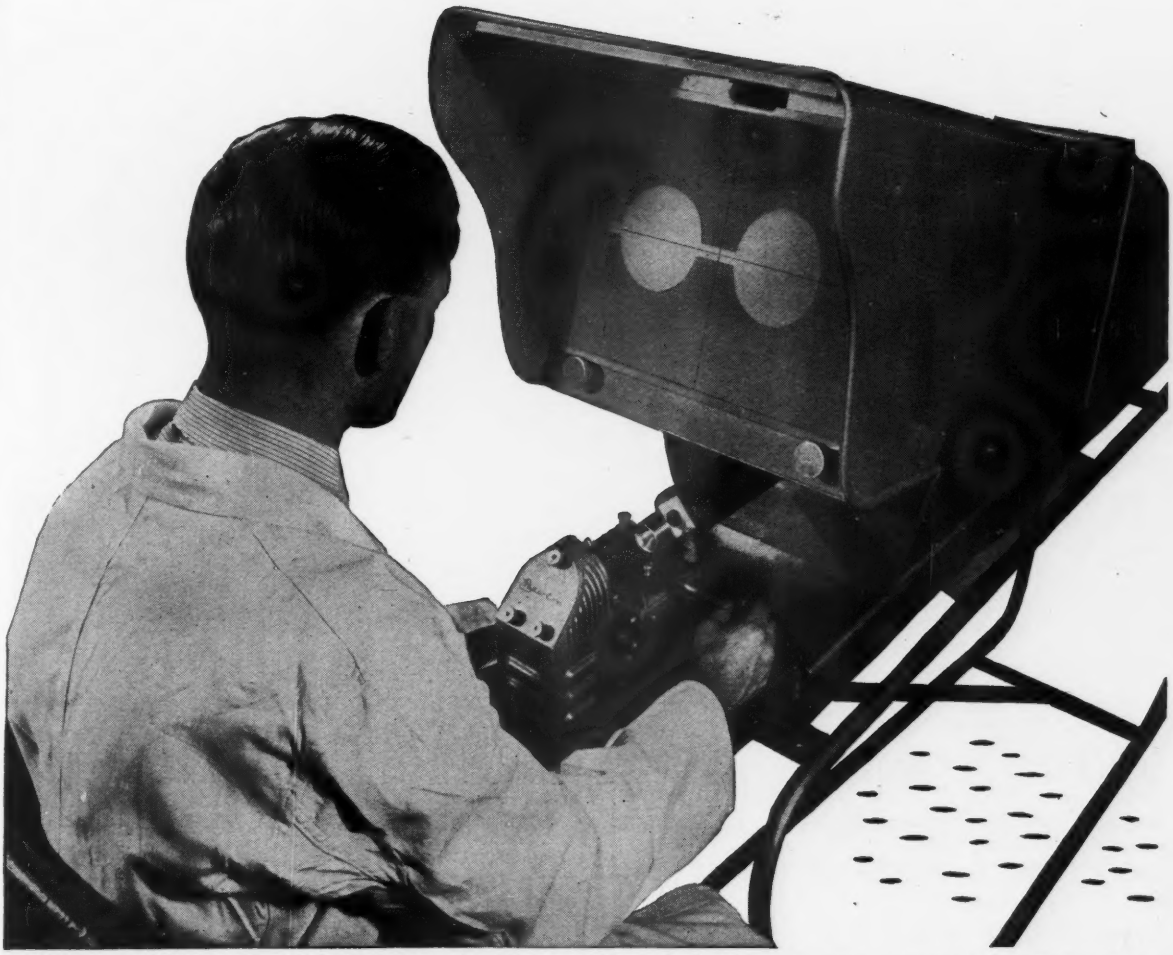
Not a Shadow of Doubt!

This is a Shadowgraph, used for inspecting the cores and dies with which dielectrics of BICC cables are applied. A silhouette of the core or die is projected on to a screen and magnified 100 times. Thus, dimensions can be measured with minute accuracy and the slightest flaw seen and eliminated.

Quality control techniques, such as this optical method, have been developed by BICC to ensure accuracy in cable manufacture.

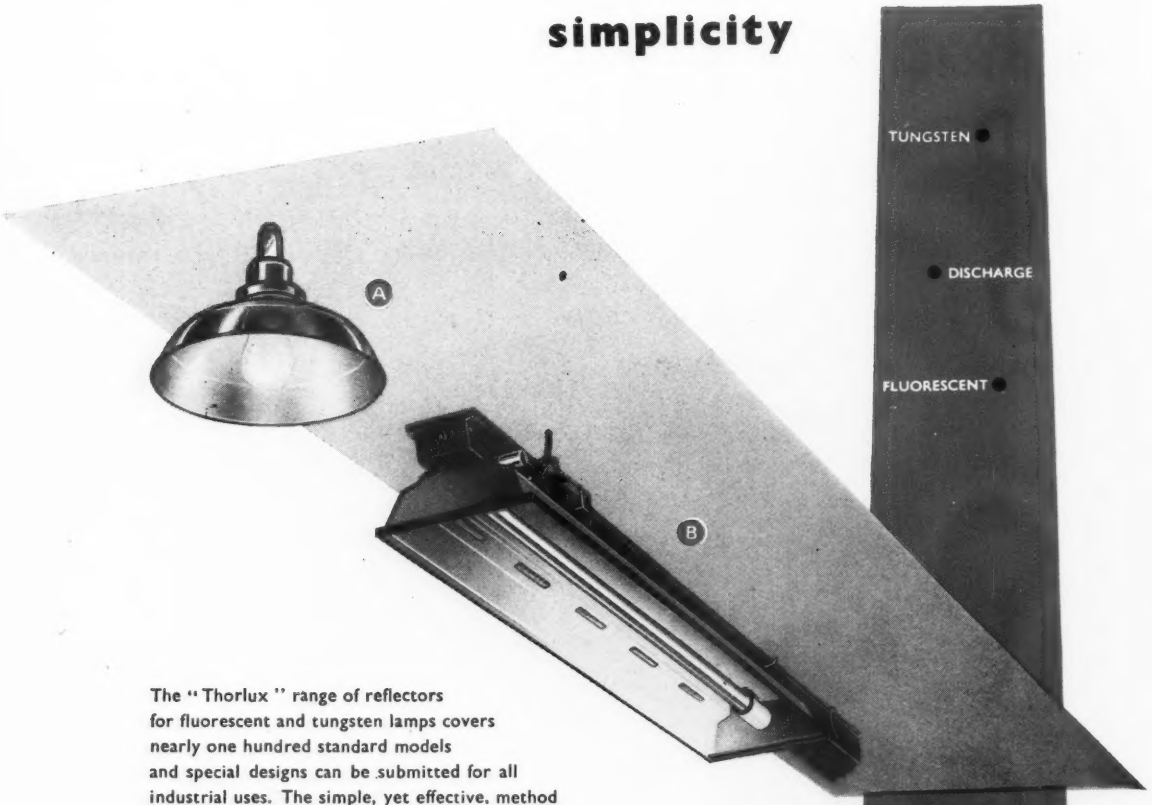
BICC **WIRING CABLES**

GOOD for years of service



BRITISH INSULATED CALLENDER'S CABLES LIMITED, 21 Bloomsbury Street, London, W.C.1

for ease of maintenance and practical simplicity



TUNGSTEN ●

● DISCHARGE

FLUORESCENT ●

The "Thorlux" range of reflectors for fluorescent and tungsten lamps covers nearly one hundred standard models and special designs can be submitted for all industrial uses. The simple, yet effective, method of detaching is a feature of both tungsten and fluorescent fittings. The "Thorlux" patent wiring box is designed both for easy wiring and to protect the cables from high temperature. Their high quality and easy maintenance make "Thorlux" the first name for trouble free lighting.

A THORLUX DISPERSIVE OVERLAMP
with patent "Koolesi" wiring box and detachable reflector.

B STANDARD CONTINUOUS WIRING CHANNEL
allowing reflectors to be mounted at any spacing.

INDUSTRIAL LIGHTING EQUIPMENT

THORLUX
REGD
THROWS LIGHT ON INDUSTRY

MANUFACTURED BY

F. W. THORPE LTD
WELBY ROAD · HALL GREEN
BIRMINGHAM 28
Springfield : 3318 . 3319 . 3310 . Grams : THORLUX . B'ham.

IMPORTANT

We are proud of our share in developing the "overlamp" type of reflector. Our patented detachable trough is rapidly becoming as popular in industry. Comprehensive catalogue ER.1057 covering complete range sent on request.

Best of both Worlds

Vulcanized fibre, Leatheroid and Pressboard have been established for very many years as proven electrical insulating materials. The demand for them continues at very high level and new applications are constantly being discovered. But with the advent of fast, faster and faster than sound aircraft, and much higher performance demands in all types of electrical equipment, the best of the new world's products have in many cases been wedded to the old, and the best of both worlds can often be achieved in insulation by combining two materials each possessing some desirable characteristic not normally obtainable in one single material.

In our DELANCO range we have three outstanding examples :—

SLOT LININGS

Resistance to abrasion or to cutting against steel laminations is well covered by DELANCO S.P.P. and C.S.T. materials. Enhanced electrical breakdown value is given by plying-up pressboard with cellulose triacetate or polyester film (Full details on page 39 of our catalogue).

FUSE CARRIERS

A tube of good mechanical strength is DELANCO TH 3. A composite tube with Delanco Vulcanized Fibre inner, and Delanco TH 3 Paper Base outer combines track resistance with mechanical strength.

ARC CARRIERS

We supply a sandwich construction DELANCO Bakelite sheet surfaced with DELANCO XXX Leatheroid. Such a material is eminently suitable for manufacture of arc barriers, and machined and pressed components used near an electric arc.

We shall be pleased to have your enquiries for these and similar materials, and shall be pleased to let you have our recommendations for your special requirements. In any case you ought to have a copy of the latest Delanco catalogue. It will be posted by return of your instructions.

Anglo-American Vulcanized Fibre Co. Ltd

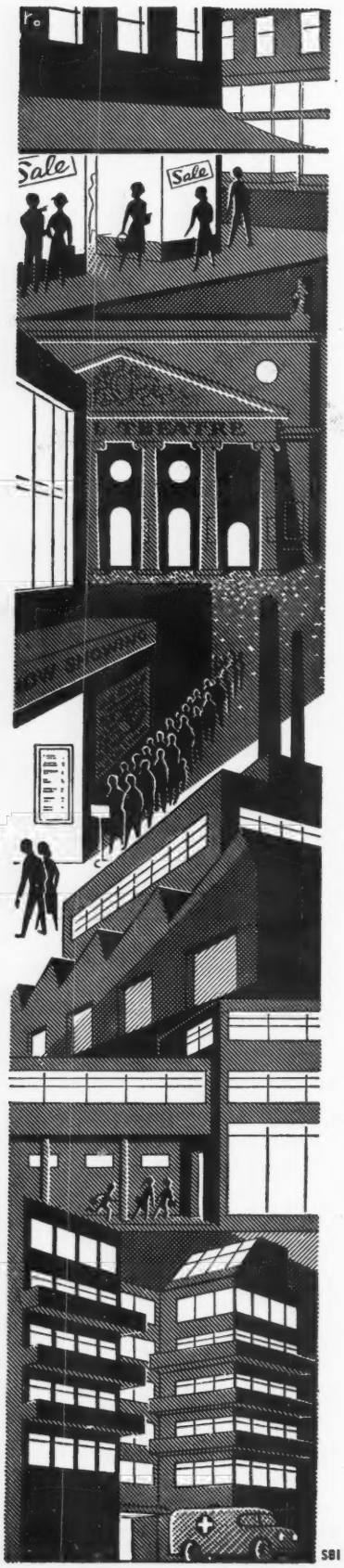
CAYTON WORKS BATH STREET LONDON E.C.1. CLE 3271 Grams: "PROMPSERV" LONDON

DELANCO WORKS • LEONARD STREET • LONDON E.C.2

VULCANIZED FIBRE • LAMINATED BAKELITE
PRESSBOARD • PRESSPAHN • CLOTHS, TAPES AND SLEEVINGS

Delanco Electrical Insulation

LEATHEROID • MICA • COMPOSITE INSULATIONS
EBONITE • PRESSED, TURNED AND MACHINED COMPONENTS



Every other day

THERE'S NO GLAMOUR about emergency lighting. No social prestige, either. All over the country, tens of thousands of ambitious young husbands are definitely *not* saying, 'Darling, the very next time the boss raises my salary, we'll install emergency lighting.' Until they get round to becoming responsible for such concerns as Banks or Hospitals or Cinemas or Big Stores or Dance Halls or Art Galleries or Power Stations, they won't need it.

It seems surprising, in the circumstances, that another Keepalite automatic emergency lighting unit is installed every other day. And more than 5,500 have been installed already.

The fact is that the people who do need emergency lighting predominantly choose Keepalite—and for very good reasons. Keepalite is automatic. Automatically switches itself on in the actual instant of mains interruption: automatically trickle charges its battery between times. Keepalite also has the advantage of being backed by the full resources and services of the biggest battery manufacturing company in the British Commonwealth. And Keepalite is very easy to install. The free advisory service of our electrical engineers makes sure of that!

Keepalite

AUTOMATIC EMERGENCY LIGHTING EQUIPMENT

For every purpose — large or small

A PRODUCT OF CHLORIDE BATTERIES LIMITED
Exide Works · Clifton Junction · Swinton · Manchester
and Grosvenor Gardens House, Grosvenor Gardens, S.W.1
Offices at Belfast · Birmingham · Bristol · Glasgow and Leeds

'O' RINGS

Full range of British standard sizes available

BONDED Seals

Steel and rubber bonded joint washers for pressures up to 10,000 lb. square inch.

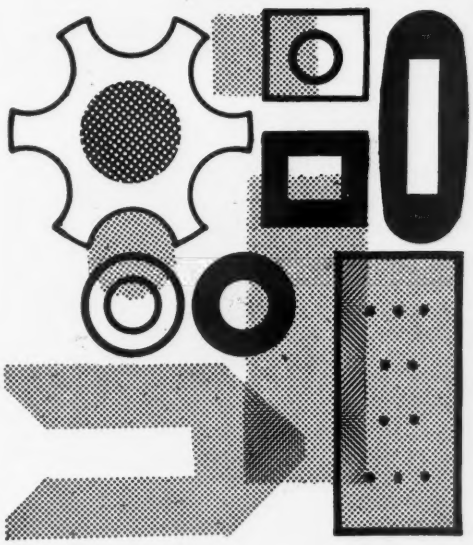
'SELOCS'

The multi-purpose washer that locks, seals and protects.

Enquiries invited for all types of mechanical seals and mouldings in P.T.F.E., synthetic, natural and silicone rubbers.

DOWTY Seals

DOWTY SEALS LIMITED ASHCHURCH GLOS



The shapes of precision Electrical Insulation . . .

Mica and other insulating components

We are manufacturers of essential Insulation Parts, to the Electrical Industry over an extensive field both at home and overseas. A wide range of Mica, bonded resin and Micanite Processed Parts, punched, cut, split and gauged to precise specifications are produced speedily and with the utmost accuracy. A large section of our resources is devoted to the production of heating element insulating parts, stove plates, water level gauge glasses, compass cards and washers. Enquiries relating to all markets are welcomed.

DACIER Ltd

22 BARGATES • CHRISTCHURCH • HANTS • ENGLAND

Tel : Christchurch 1011

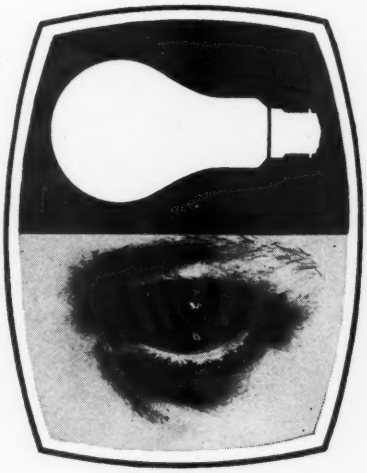
Cash in on Crompton's record breakers!

BY APPOINTMENT TO HER MAJESTY THE QUEEN MANUFACTURERS OF ELECTRIC LAMPS

Nowadays more and more people don't just say 'lamps', they say 'Crompton'. Thank Crompton's good name, Crompton's good quality, Crompton's good advertising for that!

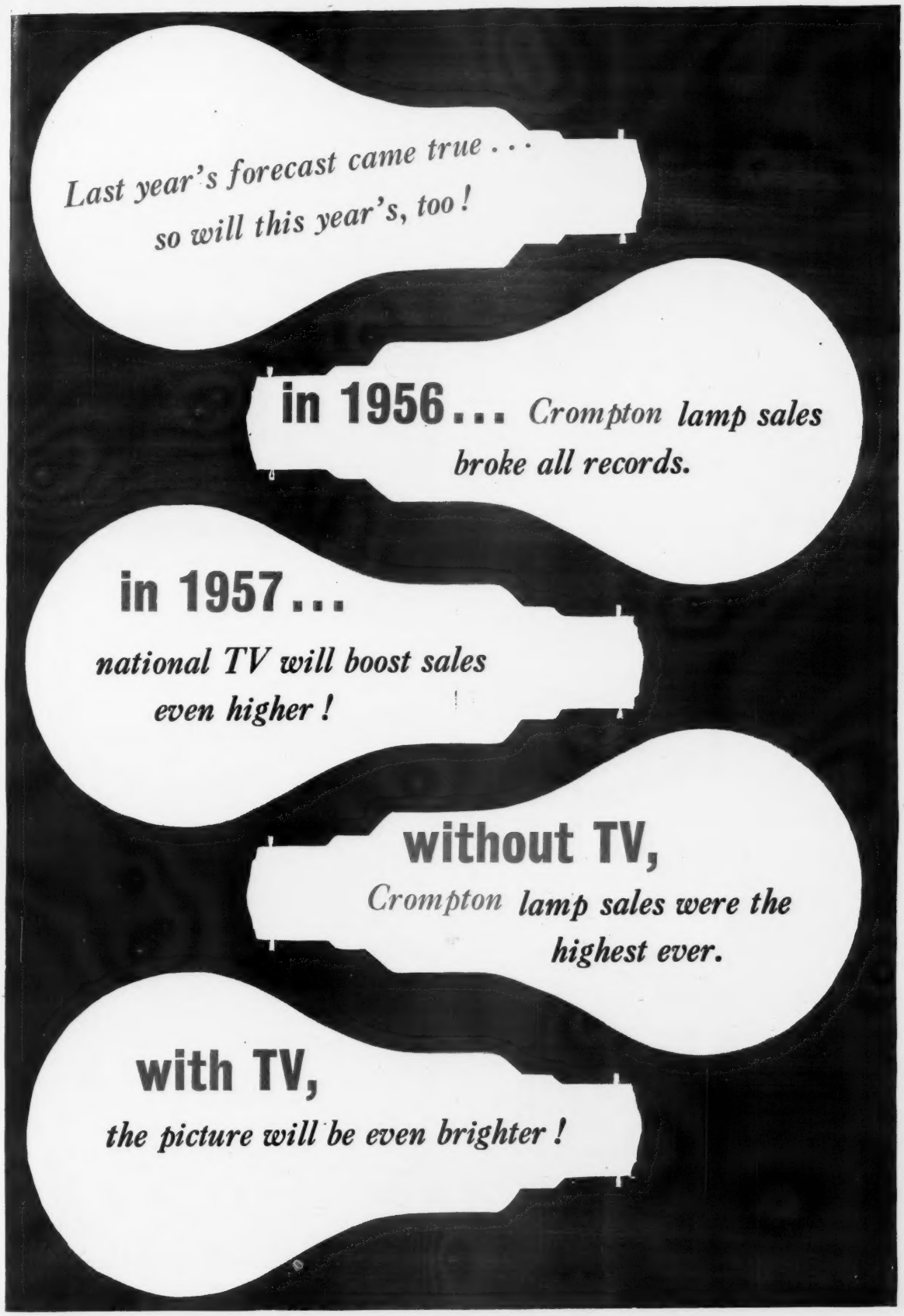
To national press advertising . . . to yet another attractive range of showcards and other sales aids, add the power of nation-wide television coverage—and you'll see that Crompton lamps are going to be asked for by even more customers this lighting season!

The Crompton Lamp sales curve is climbing steeply all the time; and so can *your* takings . . .



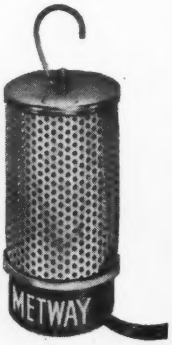
Order your stocks of Crompton lamps – you'll *see* why!

CROMPTON PARKINSON LTD., CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2. TELEPHONE: CHANCERY 3333. TELEGRAMS: CROMPARK ESTRAND LONDON


Last year's forecast came true . . .
so will this year's, too!
in 1956 . . . Crompton lamp sales
broke all records.
in 1957 . . .
national TV will boost sales
even higher!
without TV,
Crompton lamp sales were the
highest ever.
with TV,
the picture will be even brighter!

New Lines by METWAY PRODUCTS for this Season

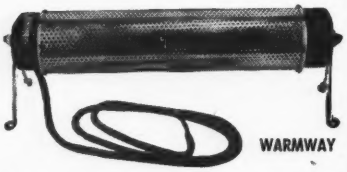
"SUPERWAY" BOWL FIRE
List No. DA 150 600 watts
Price 18/6 (P.T. 6/6)



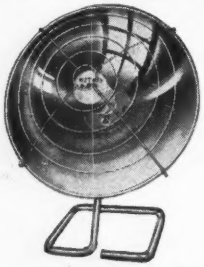
"FROSTAWAY" HEATER
The little heater with 101 uses
CAR RADIATORS, WATER TANKS AND PIPES, GREENHOUSES, KENNELS, PIANOS, etc.
List No. DA 11
Available 25 watt, 60 watt, 100 watt
All 11/- (P.T. 4/9)

"WARMWAY" HEATER
For Airing Cupboards, etc.
List No. DA 1911 250 watt 19/11 (P.T. 8/7)
List No. DA 1911/A 500 watt 25/- (P.T. 10/10)

"HEALTHWAY FOUR" MEDICAL LAMP
List No. DA 346
450 watt Mixed Wave
Price 34/6 (P.T. 15/-)



NOT FORGETTING LAST YEAR'S BEST SELLERS!

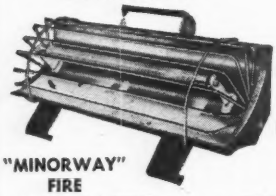


"MIRRORWAY" BOWL FIRE
List No. DA 219

BOWL FIRES
DA 219 750 watt 21/9 (P.T. 9/5)
DA 333 1000 watt 33/3 (P.T. 14/5)

REFLECTOR FIRES
DA 199/S 750 watt 19/9 (P.T. 8/6)
DA 610/S 2 kW 61/- (P.T. 26/5)

MEDICAL LAMPS
DA 300 250 watt 30/- (P.T. 13/-)
DA 396 250 watt 39/6 (Prescrtn. Type)



"MINORWAY" FIRE
List No. DA 199/S

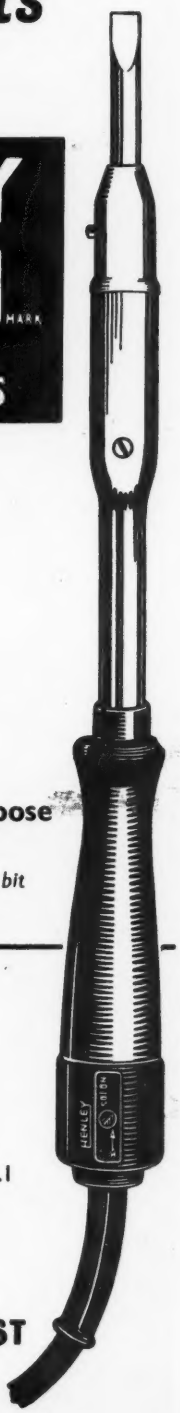
ELECTRIC KETTLES
DA 389 2 pint 750 watt 38/9 (P.T. 8/5)
DA 559 4 pint 1500 W Auto 55/9 (P.T. 12/1)

• FOR FULL DETAILS ASK FOR OUR NEW CAT. No. DAR 8/ER

METWAY WORKS - KEMP TOWN - BRIGHTON

All the experts use—

HENLEY SOLON
TRADE MARK
ELECTRIC SOLDERING IRONS



★ *Reliable*
★ *Speedy*
★ *Long-lasting*

A model for every purpose

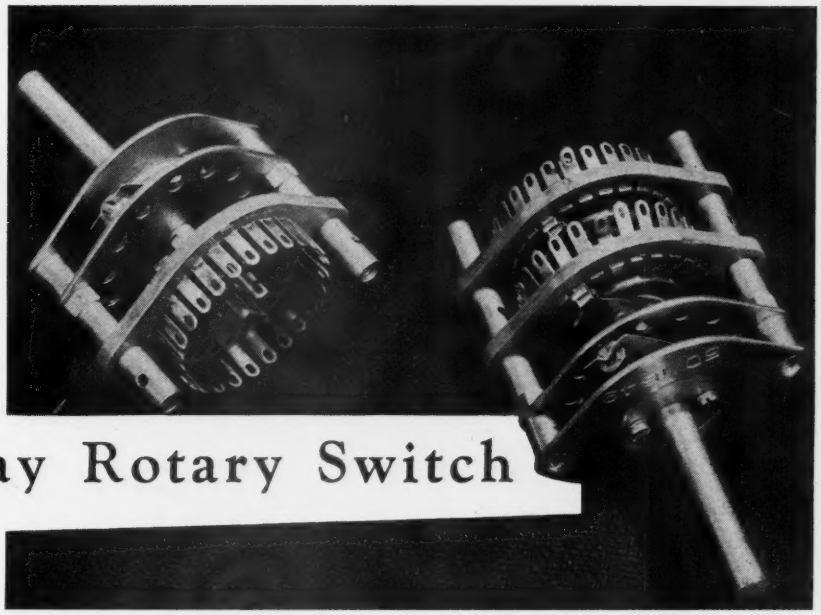
65 watt round pencil bit

Leaflets on request from:

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51-53 Hatton Garden, London, E.C.1
Tel: CHAncery 6822

FOR 25 YEARS THE BEST

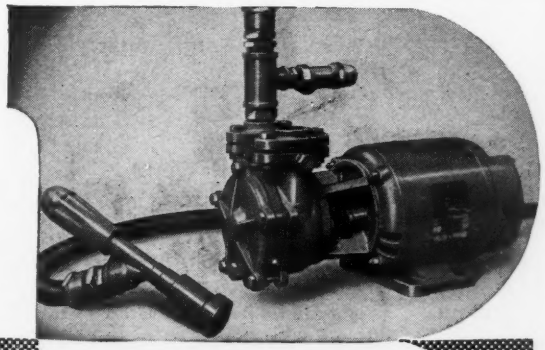
A total of 156 ways per switch are possible



26-way Rotary Switch

Hendrey Relays

HENDREY RELAYS LTD. · BATH ROAD · SLOUGH · BUCKS · Telephone: Burnham 609/610
MANUFACTURING ELECTRICAL ENGINEERS · CONTROL AND LABORATORY APPARATUS
On Admiralty, Principal Ministries and Post Office Lists. A.I.D. and A.R.B. Approved



A complete pressure washing outfit for only £46/11/6

It's compact, efficient, simple to use and ideal for private or commercial washing installations, for use in dairies and whenever high-pressure washing is needed. The gun is adjustable to provide a fine spray or 67 lbs per square inch jet — it will also cut-off the water supply. May we send you more details? Please ask for list PF.383

BN.218

BERESFORD pressure-washing PUMPSETS

James Beresford & Son Ltd.
Kitts Green, Birmingham 33 Telephone: STEchford 3081
and at London, Glasgow, Manchester, Leeds, etc.

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PERMANENT ENGRAVING ON LAMINATED MATERIAL

A wide range of standard blanks always in stock for engraving to customers' requirements

SEND FOR DETAILED QUOTATION

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LOW LUBRICATING INLET TEMPERATURE

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hello, young lovers!

price **23/6**

Simplex

Corrilux

for
passages
corridors
doorways
staircases
arches
farm out-buildings
and any other
locations
frequented by
courting couples

OUR LEAST-POPULAR PRODUCT with many of the Young Set is the Simplex Corrilux. They dislike its excellent light distribution. They loathe its complete weatherproofing. They despair of its exceptional strength. And they won't thank you if you try to tell them about its —

simple installation
1-piece glass
adaptability—holds any lamp up to 100W, through wiring
2" centre, and 2 brick-width knockouts
2 secret key screws

Corrilux lighting fittings by **Simplex**

Simplex Electric Co Ltd

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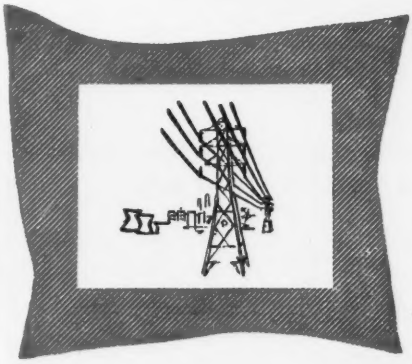
A COMPANY

Everyone knows . . .



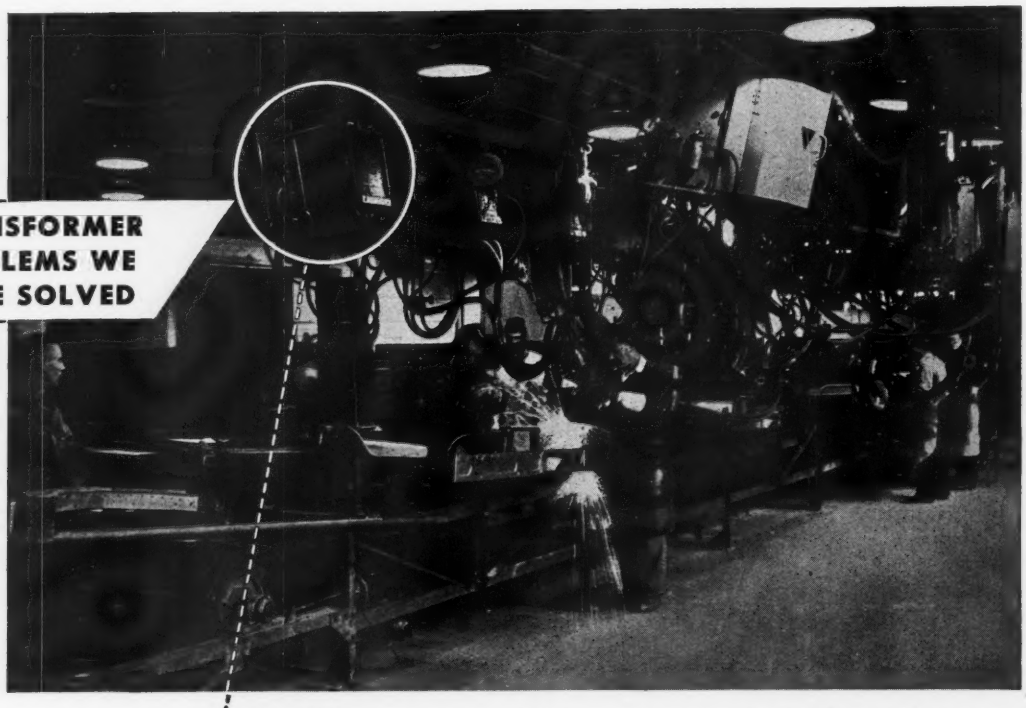
SPENCER WIRE *gets around*

Spencer's Copper Strand, all Aluminium and Steel Cored Aluminium Conductors are being used for the carrying of electricity on overhead transmission lines and in many electrification schemes at present being undertaken in the United Kingdom. Spencers also manufacture Copper and Aluminium wire for cables, transformers, motors and the Electrical trade generally.

THE SPENCER WIRE COMPANY LIMITED · WAKEFIELD

Telephone: *Wakefield 6111 (10 lines).* Telegrams: *Spencer, Wakefield, Telex.* Telex No. *55.200*

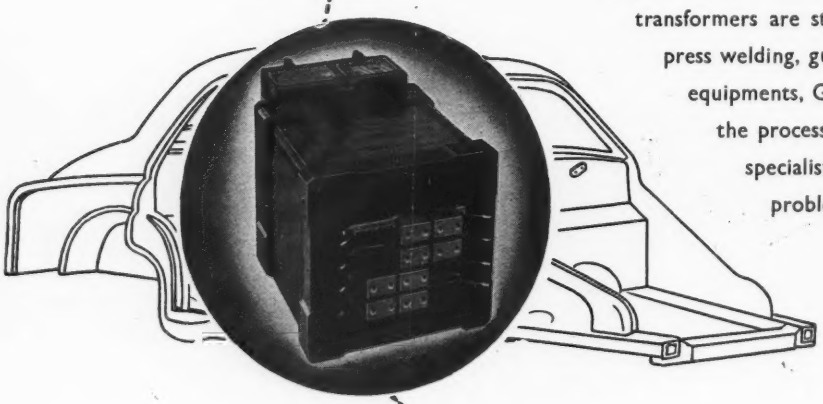
DsW625



TRANSFORMER PROBLEMS WE HAVE SOLVED

Welding in the motor industry

Day in, day out, these Gresham watercooled secondary transformers are standing up to gruelling tasks. In press welding, gun welding, H.F. heating and other equipments, Gresham provide the power behind the process. Ask the Gresham transformer specialists to solve your transformer problems.



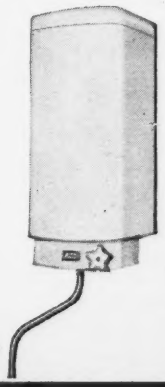
TO EVERY TRANSFORMER PROBLEM THERE'S A GRESHAM ANSWER

RING THE SPECIAL APPLICATIONS DIVISION AT FELtham 2271 (7 lines)

HANWORTH **GRESHAM** MIDDLESEX
TRANSFORMERS LTD

TWICKENHAM ROAD, HANWORTH, MIDDLESEX

Cook, wash and warm with Jackson



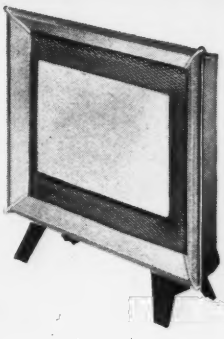
The Jackson Jill Waterheater —the latest Jackson line— 3 gallon model £16.3.0. and 1½ gallon model £15.1.0. *incl. P.T.*

The Jackson Washboiler— demand is great—a proven winner. Model 908 £12.2.0. Model 909 £13.17.0.

Jackson have increased their range of Electric Fires. Available in "House and Garden" colours. Ask to see the complete range.

The "Masterpiece" Convector in a variety of colours—a really efficient convector in the most attractive design. 1 and 2 kW. models from £12.4.7. *incl. P.T.*

Cookers 392/4—in colours with glass door from £34.12.6.
192/4—known the world over from £40.10.0.
69J—The "Giant" capacity table cooker, with radiant plate £19.10.0.
All Jackson cookers fitted with the wonderful new Speedring plate as standard.



NOTE: Most Jackson products can be colour matched in the kitchen, in a Turquoise Blue, or Eau-de-Nil Green, apart from All-Cream or All-White.

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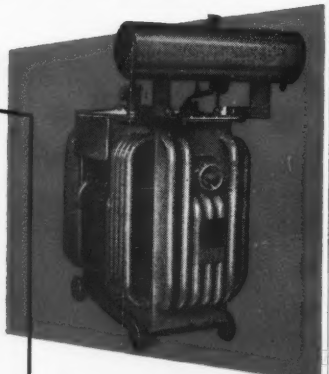

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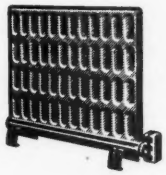

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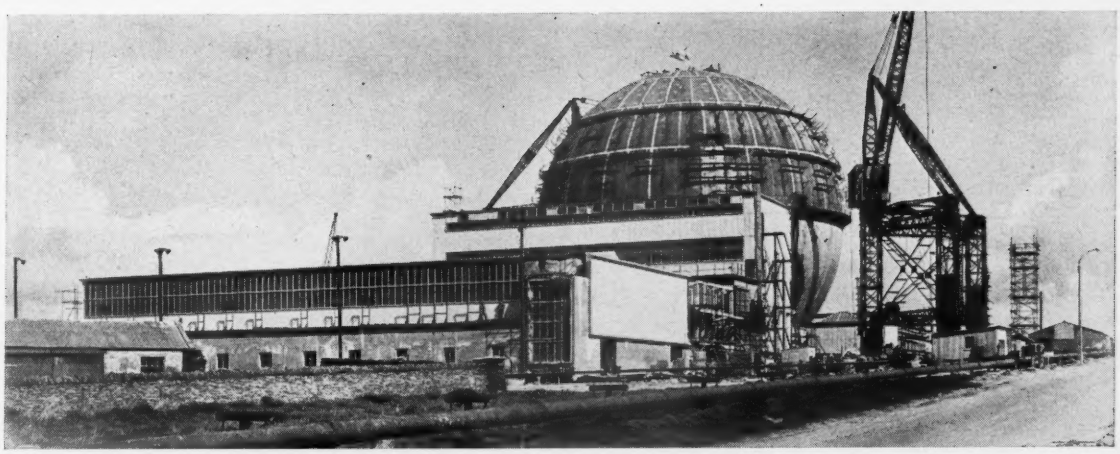

Photograph by courtesy of "Electrical Review" Fast breeder reactor at Dounreay

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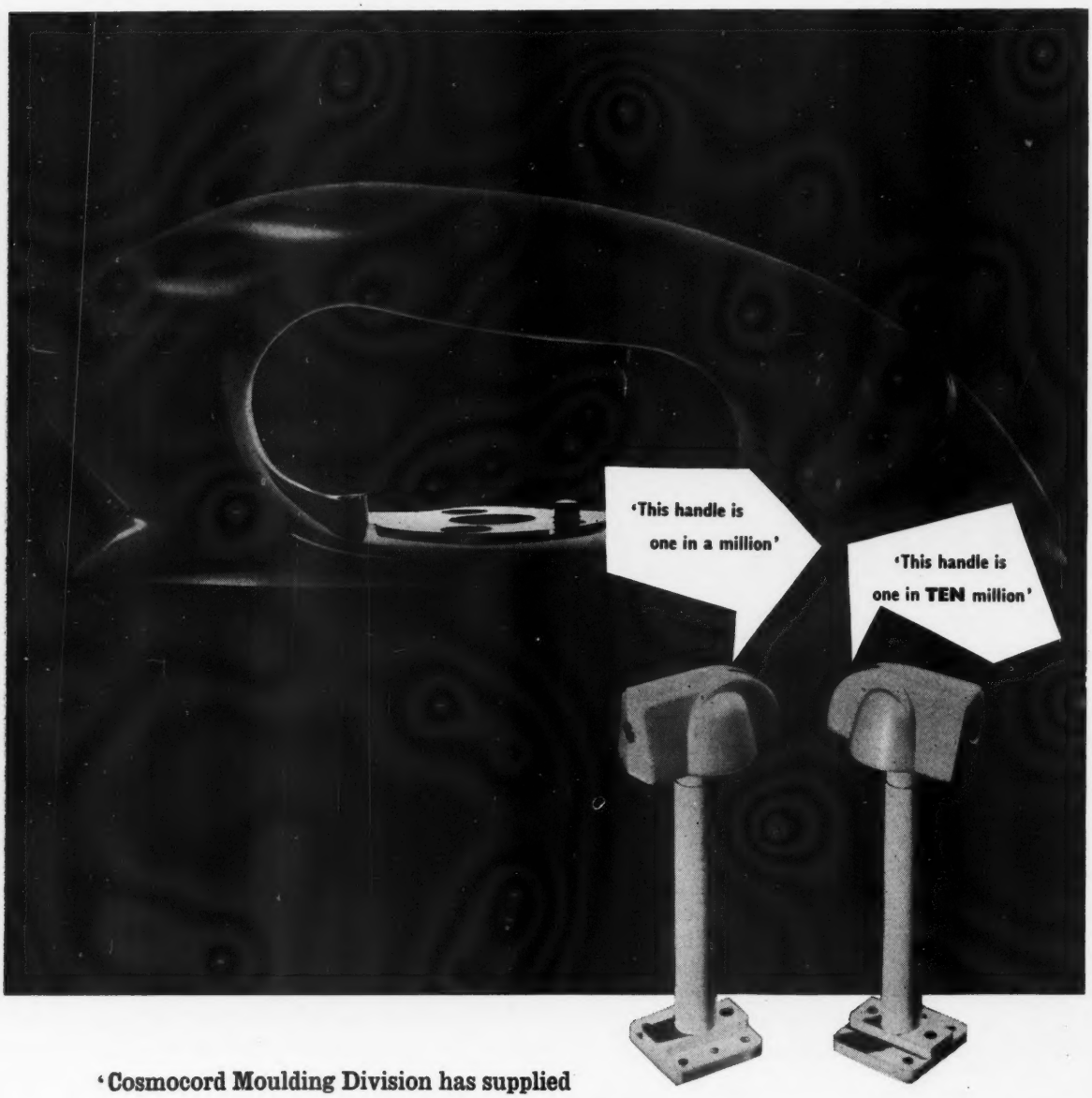

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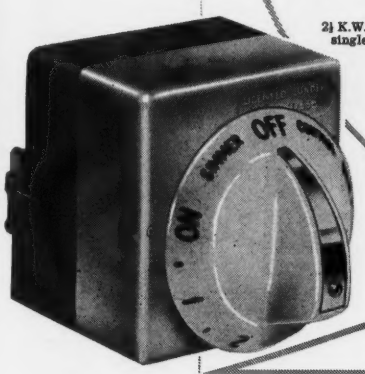

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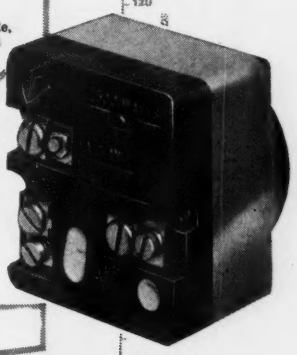

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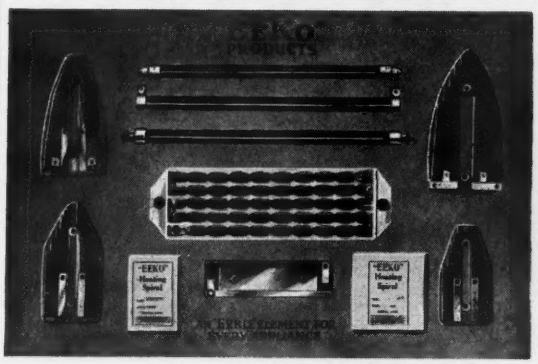

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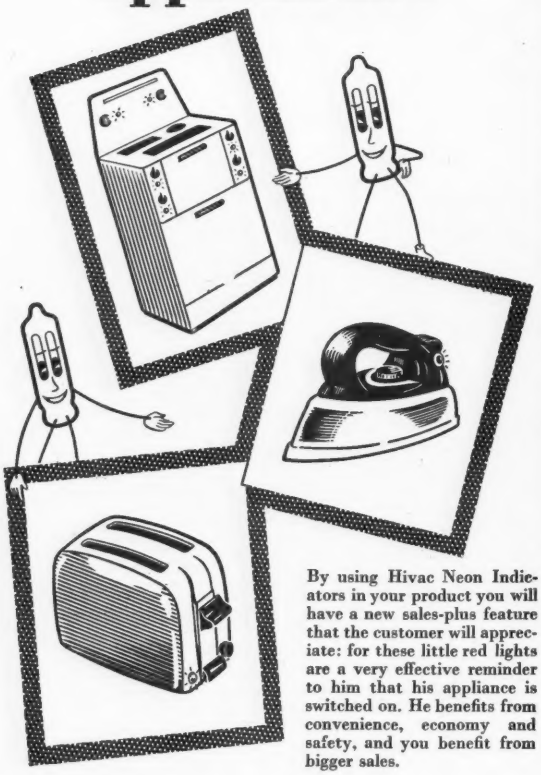

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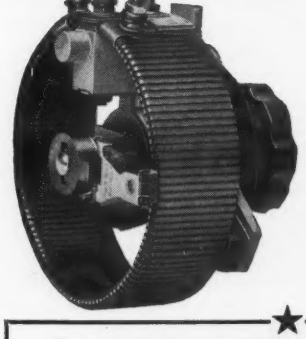

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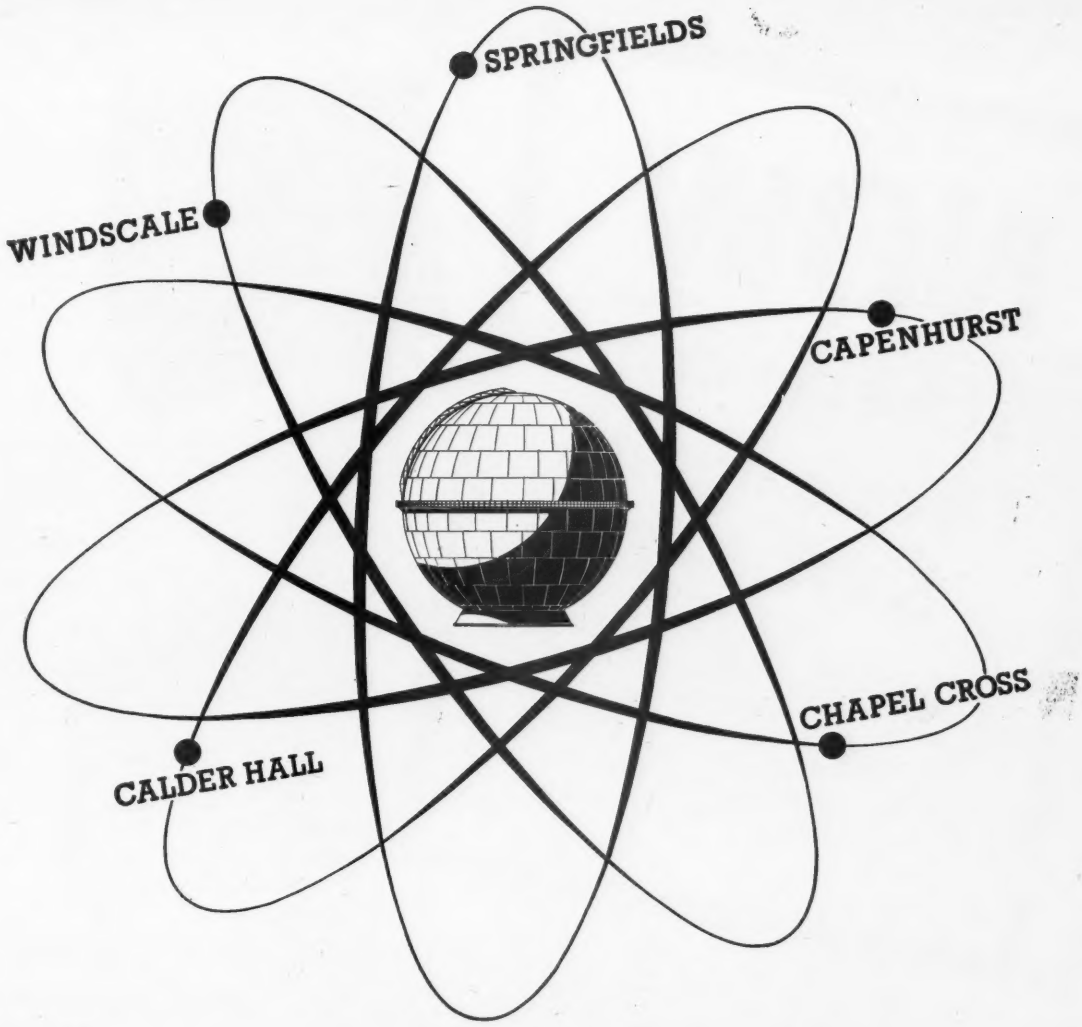

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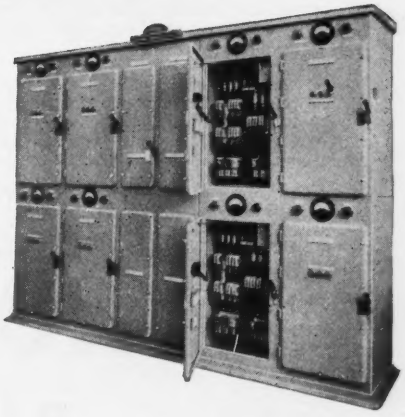

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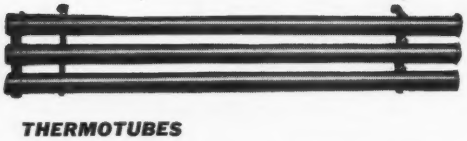

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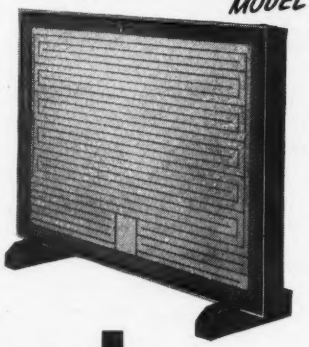

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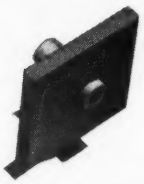

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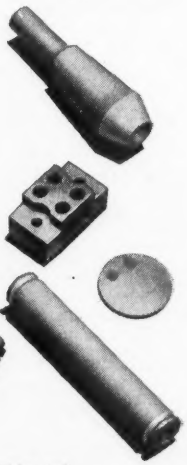

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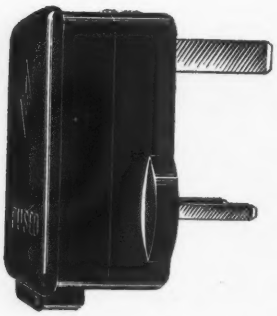

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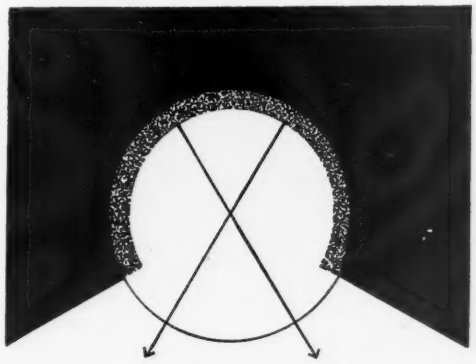

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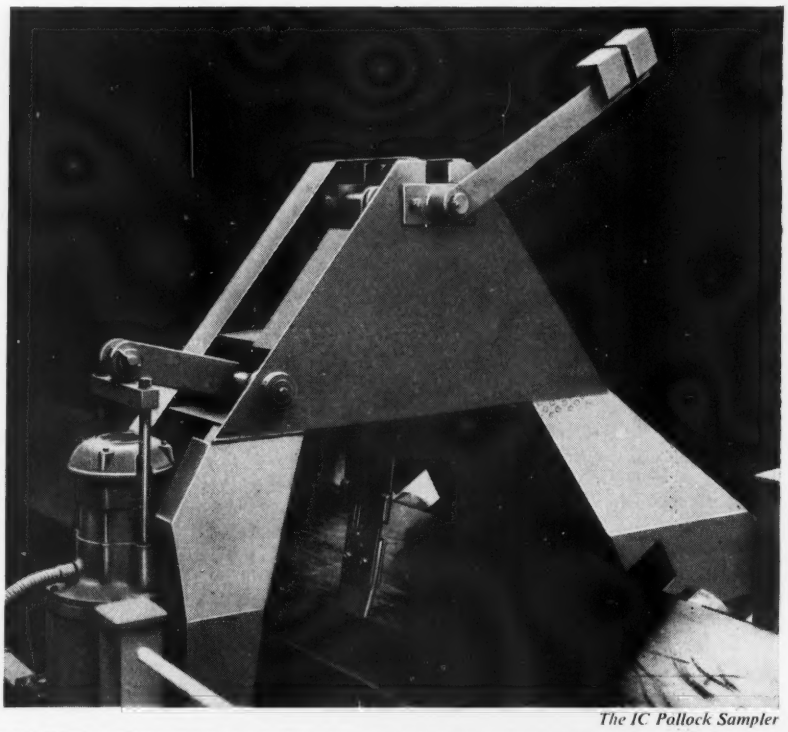
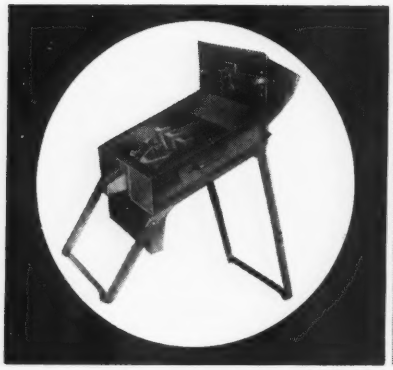


The IC Pollock Sampler



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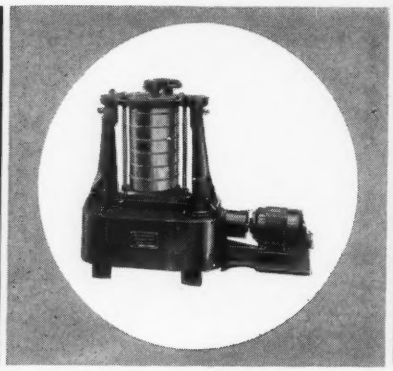

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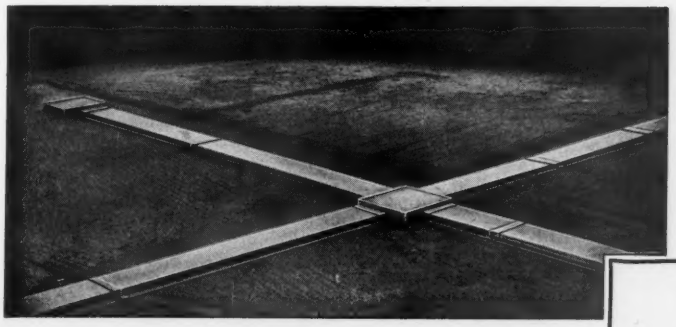

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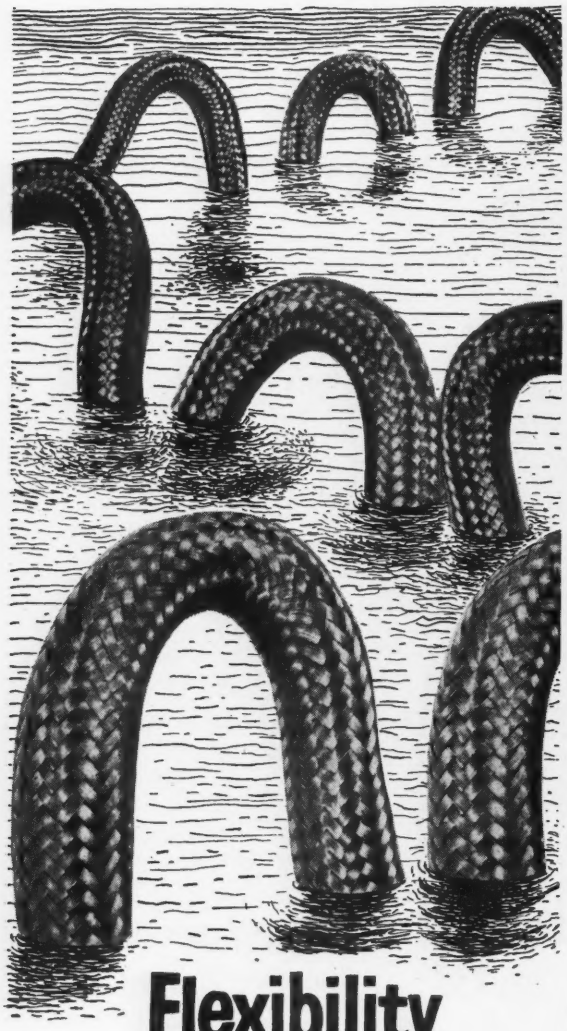

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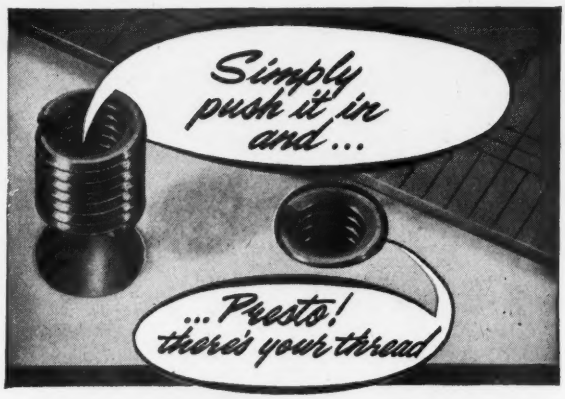

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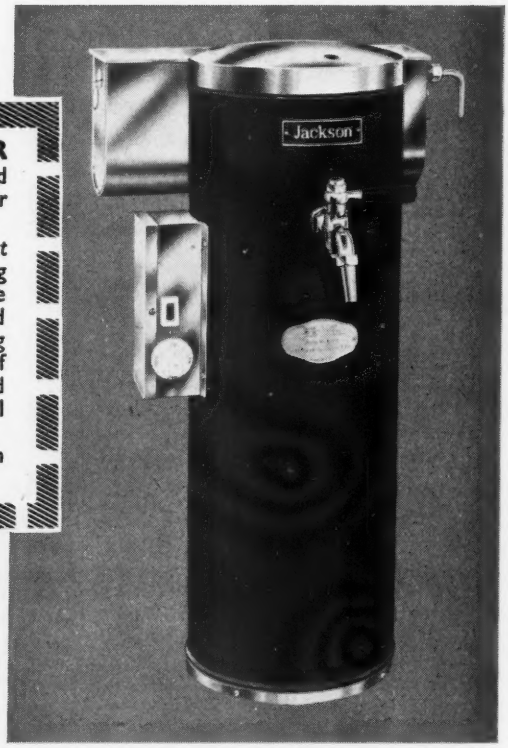

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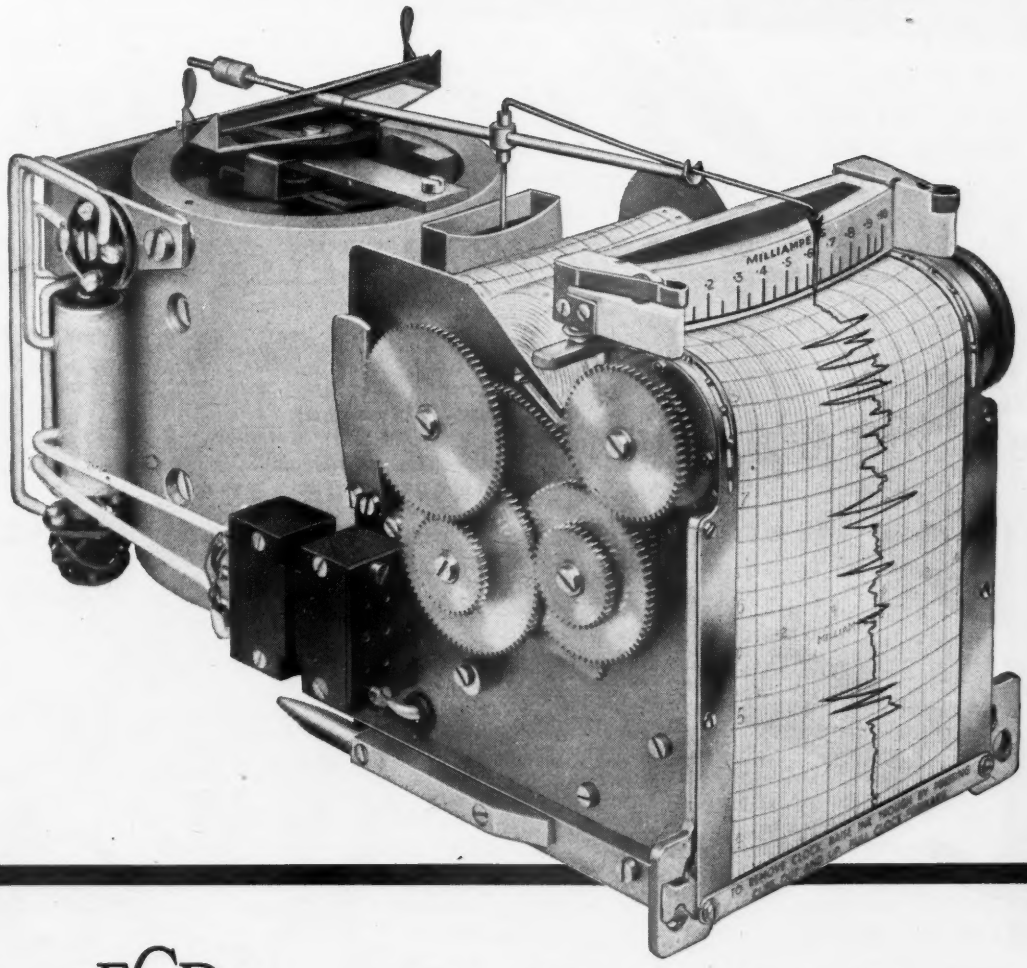

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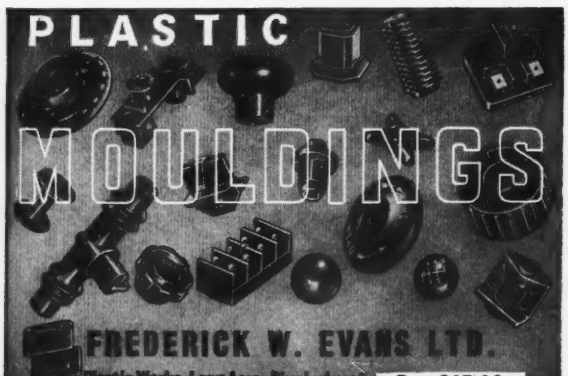

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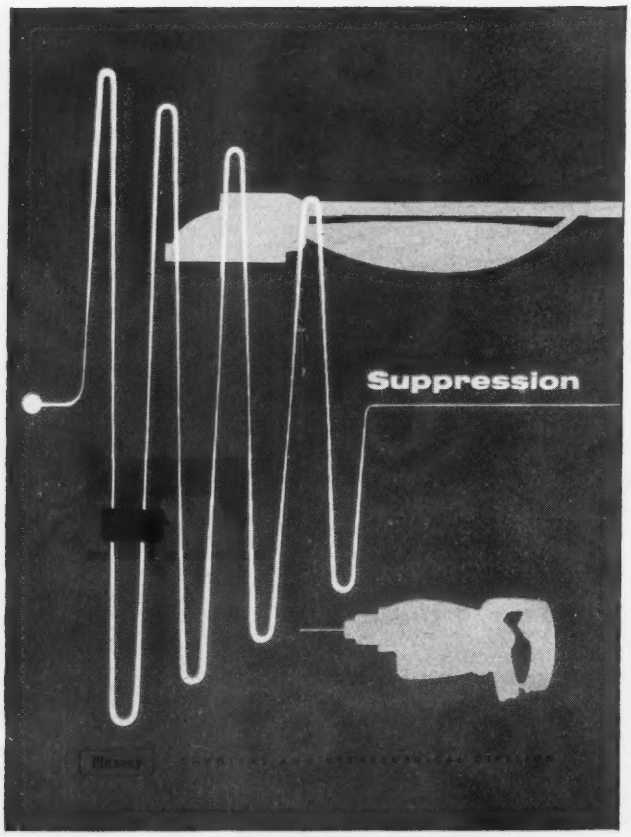

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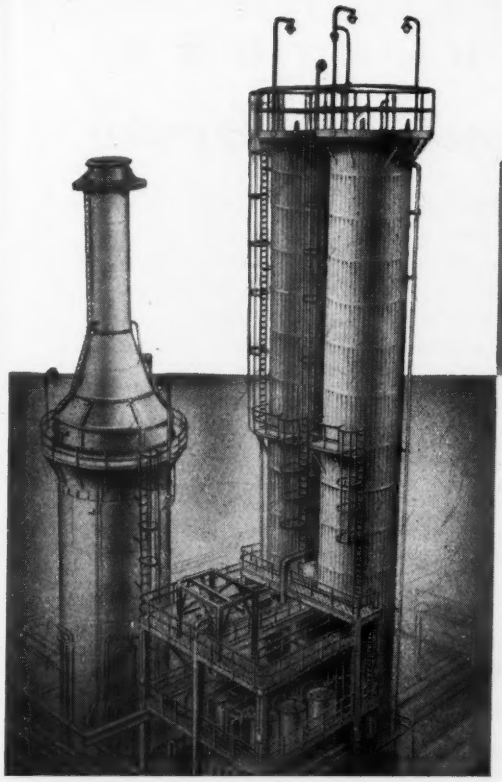

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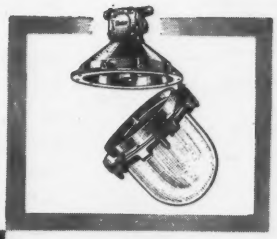

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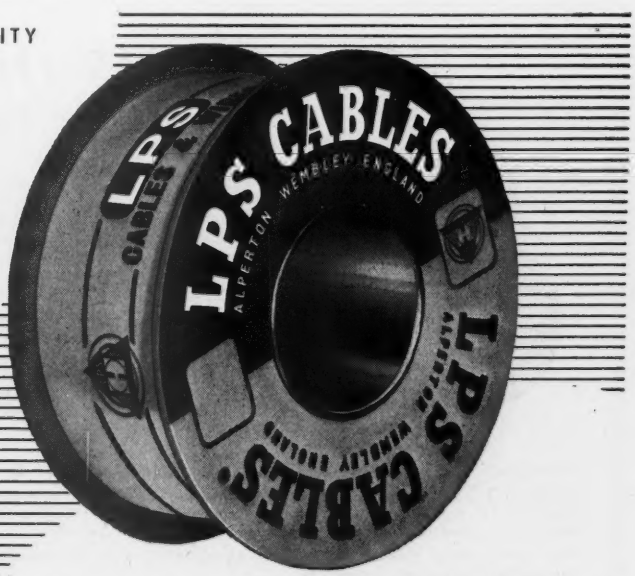

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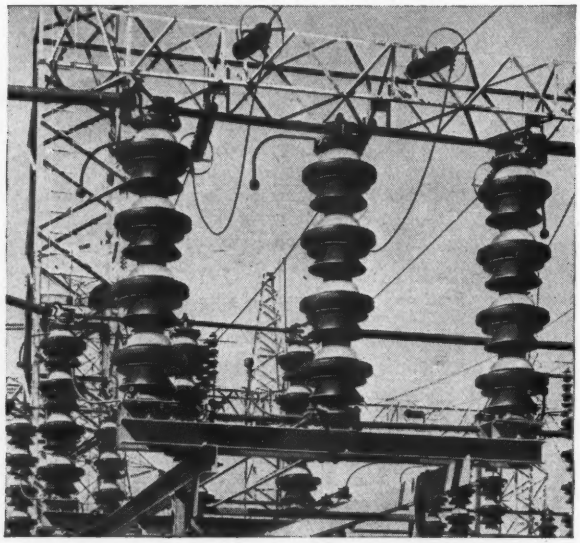

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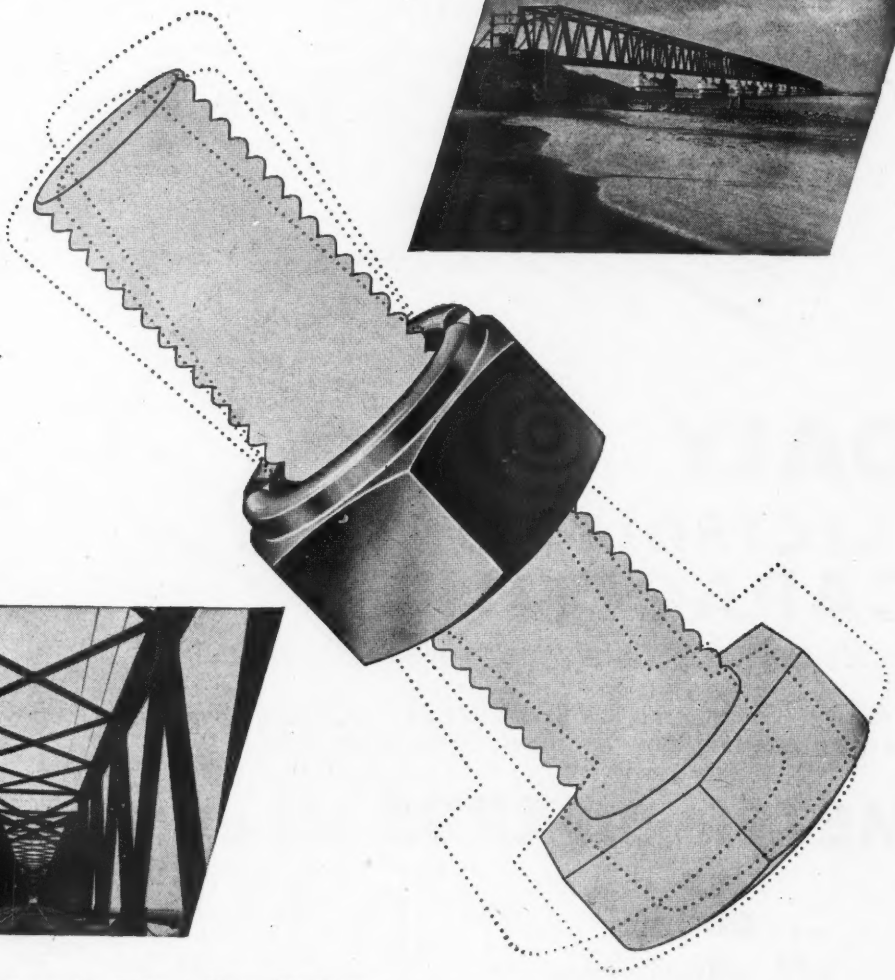

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31 Stafford Street, Birmingham 4
Telephone: Central 7101
For all electrical contracting installations, lighting, heating, power, public address, etc.

Electrical and Mechanical Engineers, Factors
THE BIRMINGHAM POWER TRANSMISSIONS LTD.
56-62 Miller Street, Aston, Birmingham 6
Telephone: AST. 2088-9

For Electrical Installations of Quality consult:
HAROLD F. WARD LIMITED
420 Stratford Road, Birmingham 11
Telephone: VIC. 4041 (5 lines)

. . . for all electrical installations
F. H. WHEELER & CO. LTD.
553 Moseley Road, Birmingham 12
Telephone: Calthorpe 2601-2

DYNAMO & MOTOR REPAIRS LTD.
Belgrave Terrace, Soho Road, Birmingham 21
Telephone: Northern 0898
Motor and generator repairs and rewinds. Installations and factory maintenance. Electrical plant stockists

ELECTRICAL INSTALLATIONS LTD.
Faraday Works, Stoney Stanton Road, Coventry
Telephone 2970
Industrial Electrical Work of All Kinds. Over 40 Years' Experience

G. G. WALKER & CO. (Dudley) LTD.
31 Hall Street, Dudley
Telephone : 4474/5
Rewinds, Lighting, Power, Electric Furnace, Electronic Installations and Maintenance. Est. 40 years. E.C.A. Members.

COOPER & CO. (SHREWSBURY) LTD.
29/31 Ellesmere Road, Shrewsbury
Telephone 4618 (2 lines)
For all classes of Electrical Installations
Members of E.C.A. Contractors to H.M. Govt. Depts.

THE TRUMAN ELECTRICAL COMPANY
40/42a Upper Bridge Street, Walsall, Staffs
Telephone: 2198 (3 lines)
Electrical Installations, Heating and Ventilating.

SOUTH WALES

CLARKE BROS. (Stroud) LTD.
Green Park Street, Aberavon
Telephone : Port Talbot 791
Electrical Engineers and Contractors
Rewinds and Repairs. Industrial Installations

. . for all electrical installations
F. H. WHEELER & CO. LTD.
117 Woodville Road, Cardiff
Telephone 21281-2 *Telegrams: "Whelect"*

CLARKE BROS. (Stroud) LTD.
High Street, Merthyr Tydfil
Telephone : Merthyr Tydfil 377
Electrical Engineers and Contractors
Rewinds and Repairs. Industrial Installations

MERSEYSIDE & N. WALES

TROUGHTON & YOUNG LTD.
46 Rodney Street, Liverpool 1
Telephone: Royal 9231-2
Electrical Engineers and Contractors

H. J. CASH & CO. LTD.
28 Chapel Street, Liverpool 3
Telephone : Central 0452
Electrical Engineers and Contractors

YORKSHIRE

Electrical Engineers and Contractors
SOUTHERN & REDFERN LTD.
Woodhead Road, Bradford 7
Textile Maintenance, Repairs and Rewinds
Telephones: Bradford 23871—Late Phone: Bradford 65837

EDMUNDSONS CONSTRUCTION CO. LTD.
Electrical Engineers and Contractors
2 Hartley Hill, Leeds 2
Telephone: Leeds 33791

. . for all electrical installations
F. H. WHEELER & CO. LTD.
44 Bank Street, Sheffield 1
Telephone 24015 (3 lines) *Telegrams: "Whelect"*

. . . for all electrical installations
F. H. WHEELER & CO. LTD.
Paver Lane, York
Telephone: York 23172

NORTH WESTERN

STEWART THOMSON & SONS (Liverpool) LTD.
Fort Road, Seaforth, Liverpool 21
Repairs and Rewinds A.C. and D.C. to 3,000 horsepower. Breakdowns, Urgent Repairs, etc. 24-hour service
Telephone: Bootle 2697-8

. . . for all electrical installations
F. H. WHEELER & CO. LTD.
Regal Buildings, Oxford Road, Manchester 1
Telephone: Central 8207-8

Industrial Installations
W. H. SMITH & CO. ELECTRICAL ENGINEERS LTD.
12 York Street, Manchester 2
Telephone: CENtral 2991-6
Works: Praed Road, Trafford Park, Manchester 17

Electrical Engineers and Contractors
J. A. BROWN & PARTNERS LTD.
366 Stretford Road, Manchester 15
Telephone: Moss Side 3157

THE NELSON ENGINEERING CO. LTD.
Telephone: Nelson 1545/6
Electrical and Mechanical Engineers.
Complete Industrial Installations. Rewinds
Netherfield Road, Nelson

H. J. CASH & CO. LTD.
28 Chapel Street, Liverpool 3
Telephone : Central 0452
Electrical Engineers and Contractors

NORTH EASTERN

DALE ELECTRIC (YORKSHIRE) LTD.
Filey, Yorks. Also at Malton and Driffield
Telephone: Filey 2301 (3 lines)
Manufacturers of the DALE diesel and petrol electric generating plants. All types of electrical contracting. Estimates free and without obligation.

. . . for all electrical installations
F. H. WHEELER & CO. LTD.
52 Elswick Road, Newcastle
Telephone: Newcastle 36271

SOUTH WEST SCOTLAND

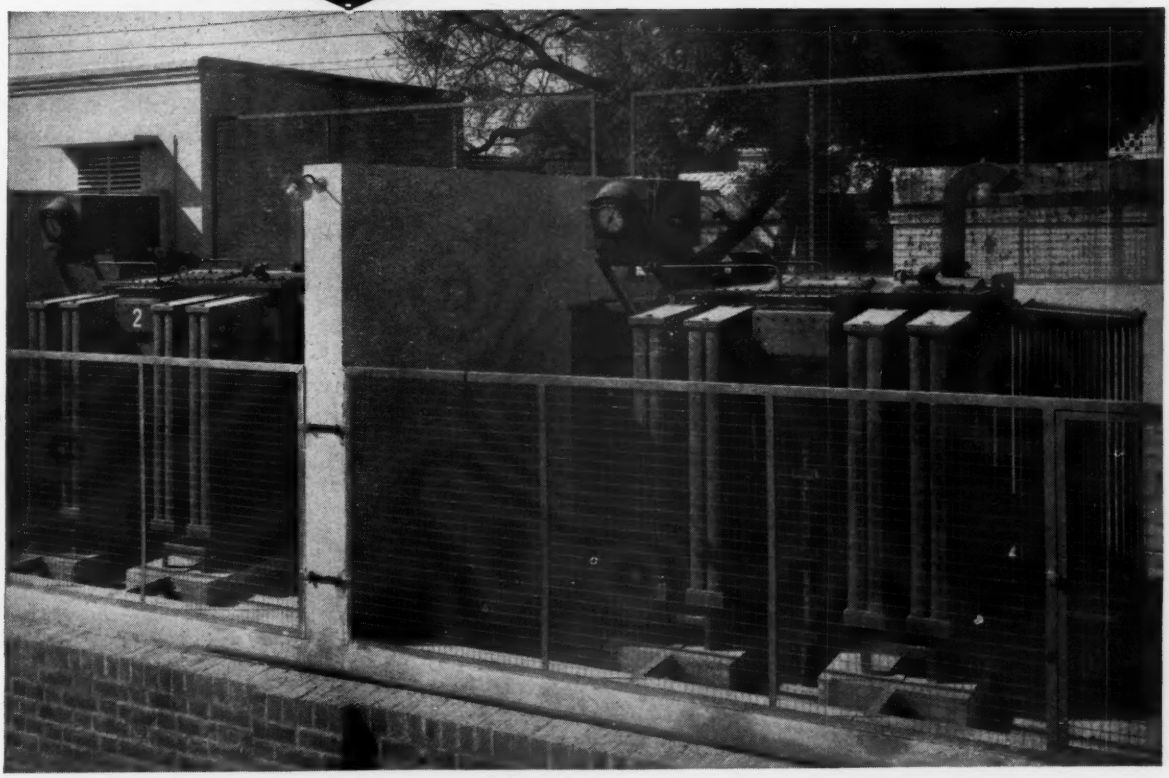
. . . for all electrical installations
F. H. WHEELER (Scotland) LTD.
144-6 North Street, Glasgow
Telephone: Central 2921

Applications for particulars of costs and standard style of advertisements in this Regional Guide should be addressed to:

THE
ADVERTISEMENT DEPARTMENT,
ELECTRICAL REVIEW,
DORSET HOUSE, STAMFORD STREET,
LONDON, S.E.1

Constructed by careful Craftsmen

We specialise in manufacturing Power Transformers for Generation, Transmission and Distribution. All YORKSHIRE Transformers are entirely constructed in our own works. We make Transformers to suit all requirements up to 60,000 kVA–132,000 volts



YORKSHIRE

ELECTRIC TRANSFORMER CO. LTD.
THORNHILL, DEWSBURY, YORKS

Telephone: DEWSBURY 1691-2

M

G.E.C.

AIRBREAK SWITCHGEAR

15 MVA to 30 MVA
400 Volt to 660 Volt

One of seventy multi-tier switchboards for controlling auxiliary supplies at the Uskmouth Power Station.

Full particulars given in Technical Description No. 405.

THE GENERAL ELECTRIC COMPANY LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Classified Advertisements

CLASSIFIED advertisements are PREPAID at 3/6 per line (approx. 6 words) per insertion. Where an advertisement includes a Box Number there is an additional charge of 1/-.

DISPLAYED CLASSIFIED:—48/- per inch. Cheques and Postal Orders should be crossed and made payable to ELECTRICAL REVIEW PUBLICATIONS LTD.

SERIES DISCOUNTS for consecutive insertions:—13, 5%; 26, 10%; 52, 15%.

SITUATIONS WANTED:—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1, but if not to be delivered to any particular firm or individual they should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Replies in such cases cannot be returned. The name of an advertiser using a Box Number will not be disclosed.

ADVERTISEMENTS are accepted up to First Post on Monday of the week of issue and should be addressed to ELECTRICAL REVIEW, Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.

Original testimonials should not be sent with applications for employment

OFFICIAL NOTICES, TENDERS, ETC.

BOROUGH OF DAGENHAM

Approved List of Firms: Building and Other Contractors

APPLICATIONS are invited from established contractors for their names to be placed on an approved list of firms to tender as and when required for works in connection with school maintenance, as follows:—

General Building Repairs and Maintenance.
Flat Roofs and Tarpaving.
Fencing (Iron, Chain Link).
Electrical Work.
Heating.
Insulating.

Applications, with particulars of similar work carried out for other local authorities, should be delivered to the Borough Engineer and Surveyor not later than 30th September, 1957.

Contractors should note that they must observe the Fair Wages Resolution passed by the House of Commons on the 14th October, 1946.

Contractors unable to adhere to this condition will not be considered.

KEITH LAUDER,
Town Clerk.

Civic Centre,
Dagenham. 7327

AYR COUNTY COUNCIL

Trunk Road Lighting

THE County Council will shortly issue separate schedules as under in connection with the installation of lighting on Trunk Road A.77 at Kirkoswald.

1. Supply of steel standards.
2. Supply of electrical equipment.
3. Work of erection.
4. Supply of lanterns for 140-w. SO/H lamps.

Contractors to indicate to County Engineer, County Buildings, Ayr, in which contracts they are interested.

Any attempt to interlink conditionally the schedules will constitute automatic disqualification.

The County Council is not bound to accept the lowest or any offer.

IVIE McCAIG,
County Clerk. 7328

ROYAL BURGH OF TAIN

Street Lighting on Trunk Road A.9

TENDERS are invited by the above Local Authority for the supply and erection of 48 Street Lighting Units complete on Trunk Road A.9 within the Royal Burgh of Tain. Specifications may be obtained from J. W. Scollay, Esq., Burgh Surveyor, Council Chambers, Tain, Ross-shire, at whose office relative drawings may be seen.

Tenders should be lodged with the undersigned not later than 12 o'clock noon on Thursday, 26th September, 1957.

Tenders must be submitted on the basis that they shall remain open for acceptance by the Town Council for a period of three calendar months from the date thereof. The Town Council do not bind themselves to accept the lowest or any tender.

A. W. GRAY,
Town Clerk.

Council Chambers, Tain.
6th September, 1957. 7376

DAMODAR VALLEY CORPORATION

THE Controller of Purchase and Stores, Damodar Valley Corporation (Electricity Dept.), Anderson House, Alipore, Calcutta, 27, India, invites tenders for the following:—

(1) 12 132-kV Circuit Breakers.
(2) 7 33-kV Circuit Breakers.
(3) 36 132-kV Current Transformers.
(4) 21 33-kV Current Transformers.

Tender specifications, PE-spec-17, for sale at £3 15s. per copy plus £1 17s. 6d. for air parcel charges, are obtainable direct from the above address in India.

Tenders are to be returned direct to the above address for opening on 24th September, 1957. Specimen copy of the above specification is on view at India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3. Ref. S.1945/57/AVH/Eng.2. 7377

STATE ELECTRICITY COMMISSION OF VICTORIA

22-32, William Street, Melbourne, Australia

THE Commission is inviting tenders for the supply, delivery and supervision of erection of one 2,000-kW Water-driven Turbo-Generator and accessory plant, Cairn Curran Power Station, Victoria, in accordance with Specification No. 57-58/48.

Full particulars are available from the Agent-General for Victoria, Victoria House, Melbourne Place, The Strand, London.

Tenders endorsed "Tender to Specification No. 57-58/48" are returnable in the Tender Box at 22-32, William Street, Melbourne, Australia, by 11 a.m. on 27th November, 1957.

The Commission does not bind itself to accept the lowest or any tender. 7367

SITUATIONS VACANT

YORKSHIRE ELECTRICITY BOARD

Head Office
CHIEF COMMERCIAL OFFICER'S DEPARTMENT

ASSISTANT (Tariffs and Statistics). The post, a new one, will be primarily concerned with load estimation, load analysis, budget estimation, tariff analysis and variation, and utilisation research, but experience of these matters is less important that the possession of initiative. A higher technical qualification or a university degree is essential. Candidates should possess an aptitude for mathematics and be prepared to study statistical methods of analysis. An interest in economics is desirable.

Salary N.J.B. Grade AX-EX.5, £810/£1,035.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Secretary, Yorkshire Electricity Board, Wetherby Road, Scarcroft, Leeds, not later than 20th September, 1957.

No. 2 (Huddersfield) Sub-Area

SENIOR DRAUGHTSMAN (Electrical). A Section Leader is required in the Sub-Area Drawing Office, Market Street, Huddersfield, for work associated with the design, layout and construction of substations operating at voltages up to and including 66 kV. Applicants should be conversant with the theory and design of electrical plant and be competent in the preparation of plant layout drawings and wiring diagrams. The minimum qualification for this post will be Higher National Certificate in Electrical Engineering or equivalent, and applicants must be capable of supervising other draughtsmen.

Salary N.J.B. Schedule D, Grade 4, £895/£20/£995 per annum.

SENIOR DRAUGHTSMAN (Civil and Building). A Section Leader is required in the Sub-Area Drawing Office, Market Street, Huddersfield, for work associated with the design and construction (including stone and reinforced concrete work) of substation, office and other buildings. Applicants should have had extensive experience in building and civil engineering work and possess the necessary technical qualifications. They should be capable of supervising other draughtsmen.

Salary N.J.B. Schedule D, Grade 4, £895/£20/£995 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than 20th September, 1957.

No. 1 (Bradford) Sub-Area
OTLEY DISTRICT

THIRD ASSISTANT DISTRICT ENGINEER. Applicants should have passed the Associate Membership Examination of the Institution of Electrical Engineers, or hold equivalent qualifications, and have experience in construction, operation and maintenance of high voltage systems, underground cables and overhead lines and substation, and medium low voltage networks.

Candidates should be prepared to reside within the District and undertake standby duties.

Salary N.J.B. Class F, Grade 9, £790/£15/£835 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45/53, Sunbridge Road, Bradford, not later than 20th September, 1957.

No. 5 (Wakefield) Sub-Area
DONCASTER DISTRICT

THIRD ASSISTANT DISTRICT ENGINEER. Applicants should have had practical training and experience in the construction, operation and maintenance of H.V. and M.V. overhead and underground distribution networks, substation plant and ancillary equipment. Candidates should preferably have attained the technical standard of the Higher National Certificate in Electrical Engineering or equivalent qualifications.

Candidates should be prepared to reside within the District and undertake standby duties.

Salary N.J.B. Class F, Grade 9, £790/£15/£835 per annum.

WAKEFIELD DISTRICT

ENGINEERING DRAUGHTSMAN. Applicants should have a good knowledge of the theory and principles applicable to the design, layout and construction of buildings, including site surveys. Experience in the making of and filing distribution mains records is desirable and a knowledge of electrical plant and equipment would also be an advantage but is not essential.

Salary N.J.B. Schedule D, Grade 6, £595/£20/£715 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 12, Denby Dale Road, Wakefield, not later than 20th September, 1957. 7390

***Situations Vacant** (continued)*

CENTRAL ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following vacancies in this Division :—

OPERATIONS ENGINEER,
WILLINGTON "A" POWER STATION
(Vacancy No. 145/57/ER).

Applicants should have received a sound technical training and have had considerable experience in the operation and maintenance problems arising in a modern power station.

Preference will be given to candidates who are corporate members of a recognised professional institution or who hold qualifications leading to such membership, and a knowledge of pulverised fuel firing will be an advantage.

Salary will be in accordance with Class K, Grade 6 (£1,235-£1,325 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 18th September, 1957.

ASSISTANT ENGINEER
(Mechanical Maintenance),
WILLINGTON "A" POWER STATION
(Vacancy No. 146/57/ER).

Applicants should have received a sound technical training and have had wide practical experience in the maintenance of power station mechanical plant.

Preference will be given to candidates who are corporate members of a recognised professional institution or who hold qualifications leading to such membership.

Salary will be in accordance with Class K, Grade 7 (£1,160/£1,235 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 18th September, 1957.

ASSISTANT ENGINEER
(Electrical Maintenance),
WILLINGTON "A" POWER STATION
(Vacancy No. 147/57/ER).

Applicants should have received a sound technical training and have had practical experience in the maintenance of power station electrical plant.

Preference will be given to candidates who are corporate members of a recognised professional institution or who hold qualifications leading to such membership.

Salary will be in accordance with Class K, Grade 8 (£1,065-£1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 18th September, 1957.

ASSISTANT SHIFT CHARGE ENGINEERS,
WILLINGTON "A" POWER STATION
(Vacancy No. 148/57/ER).

Applicants should have received a sound technical training and have had experience in a modern power station.

Preference will be given to candidates who possess the Higher National Certificate or its equivalent.

Salary will be in accordance with Class K, Grade 9 (£995-£1,055 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications, 18th September, 1957.

STATION SHIFT CONTROL ENGINEER,
SPONDON POWER STATION
(Vacancy No. 150/57/ER).

Applicants should have had a sound training and practical experience in a modern power station. The possession of a Higher National Certificate in Electrical Engineering, or its equivalent, would be advantageous.

Salary will be in accordance with Class H, Grade 10 (£835-£880 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications, 18th September, 1957.

SHIFT CONTROL ENGINEER,
COVENTRY POWER STATION
(Vacancy No. 152/57/ER).

Applicants should possess a sound technical training and have practical experience in the control of steam generating plant and the operation of switchgear.

Salary will be in accordance with Class G, Grade 10 (£790-£835 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications, 25th September, 1957.

STATION SHIFT CONTROL ENGINEERS,
WILLINGTON "A" POWER STATION
(Vacancy No. 154/57/ER).

Applicants should be suitably qualified engineers who have had experience in control and operation of large turbo-alternators.

Salary will be in accordance with Class K, Grade 10 (£935-£995 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications, 25th September, 1957.

SECOND ASSISTANT CHEMIST,
NORTH WILFORD POWER STATION
(Vacancy No. 151/57/ER).

Candidates must have had a sound technical training and some previous experience in a power station laboratory. The Ordinary National Certificate in Chemistry is regarded as the minimum qualification for this post, but preference will be given to holders of the Higher National Certificate.

Salary will be in accordance with Class K, Grade 11 (£885-£930 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 25th September, 1957.

ASSISTANT SHIFT CHARGE ENGINEER,
WARWICK POWER STATION
(Vacancy No. 155/57/ER).

Applicants should preferably hold the Higher National Certificate and have had experience in a modern power station.

Salary will be in accordance with Class E, Grade 9 (£740-£785 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 25th September, 1957.

THIRD ASSISTANT ENGINEERS (Electrical),
GENERATION (Construction) DEPT.
(Vacancy No. 153/57/ER).

Applicants should have had a fundamental training in electrical engineering, including workshops, and should preferably have had experience in the manufacture, erection and maintenance and operation of electrical plant as installed in modern power stations. Preference will be given to candidates who possess a degree or are Graduate Members of the Institution of Electrical Engineers.

Salary will be within Class AX/EX, Grade 4 (£895-£1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 25th September, 1957.

SENIOR ASSISTANT ENGINEER,
GENERATION (Operation) DEPT.,
DIVISIONAL HEADQUARTERS
(Vacancy No. 156/57/ER).

Candidates must have served an indentured apprenticeship, preferably in a large engineering works, and have received technical training to Higher National standard in mechanical and/or electrical engineering.

Experience in power station operation and/or the preparation of contract specifications will be an advantage.

Salary in accordance with Class AX/EX, Grade 1 (£1,330-£1,595 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 25th September, 1957.

These appointments will be pensionable within the provisions of the Central Electricity Authority and Area Boards (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, Central Electricity Authority, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.

29th August, 1957. 7371

BRITISH KLOCKNER SWITCHGEAR LIMITED

Chertsey, Surrey

TECHNICAL SALES ENGINEERS required for London and Home Counties. Knowledge of motor control gear; sales experience preferred but not essential. Apply giving full particulars to—Managing Director. 166

CENTRAL ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointments :—

FOURTH ASSISTANT ENGINEER,
GENERATION (Operation) DEPT.
AT DIVISIONAL HEADQUARTERS.

Salary Class AX/DX, Grade 6, £710 × £25 to £835/£910 per annum plus London weighting.

The duties will be wide in scope and will include the following :—

(a) Operation and maintenance studies.
(b) Plant projects.
(c) Special investigations including non-destructive testing.

Experience in either operation or maintenance of modern generating station plant is essential, and the candidate will be expected to work on his own with minimum supervision.

Preference will be given to candidates who hold the Higher National Certificate or who are at present pursuing a course of study with the object of obtaining this or a similar qualification.

FIRST ASSISTANT STATION CHEMIST,
BRIMSDOWN GENERATING STATION.

Salary Class K, Grade 9, £995 × £20 to £1,055 per annum plus London weighting.

Applicants should have a minimum qualification of Higher National Certificate in Chemistry or be appropriately advanced in a course of study for a recognised qualification in chemistry.

Applicants should also be familliar with the work of a modern generating station laboratory, and should have experience in the control of water treatment plant. Knowledge of ion exchange plant and generating station corrosion problems would be an advantage.

GENERAL ASSISTANT ENGINEER,
GOLDINGTON GENERATING STATION.

Salary Class G, Grades 15/14, £540 × £15 to £635 per annum, rising shortly to Class H, £590-£680 per annum.

Duties include assisting in the electrical control room and experience in the technical operation of electrical, boiler house and turbine house plant, testing, etc., in a generating station, and provide a suitable basis for promotion to higher technical grades.

Manual workers in skilled grades with suitable technical training will be considered. Previous experience in a generating station and/or technical training to the standard of Ordinary National Certificate or its equivalent will be of advantage.

Apply by 14th September, 1957, giving age, details of experience and qualifications to the Controller, Central Electricity Authority, Eastern Division, West Farm Place, Chalk Lane, Barnet, Herts. 7351

SHIFT ENGINEER

Applications are invited for the appointment of
SHIFT ENGINEER
at the
CENTRAL POWER STATION (WAR DEPARTMENT), ALDERSHOT

The post is that of Technical Officer Grade III in the Mechanical and Electrical Technical Grades of the War Department Organisation.

The provisional salary scale is £620 per annum (at age of 26) to £780 per annum plus shift disturbance allowance of 6s. 6d. per shift.

Qualifications : Ordinary National Certificate in Electrical and/or Mechanical Engineering or evidence of an equivalent standard in technical education ; and five years' apprenticeship or its equivalent with engineering concern giving a good comprehensive training.

Experience : After completing apprenticeship or its equivalent, candidates should have at least three years' experience in charge of operation and maintenance of steam and diesel electricity generating plant and switchgear.

Experience of Babcock & Wilcox water-tube boilers, Brush Ljungstrom turbo-alternators and parallel operation with the public electricity is desirable.

Application, with copies of testimonials, should be submitted to Chief Electrical Engineer, Aldershot District, Central Power Station (W.D.), Thornhill Road, Aldershot, within 14 days of the date of this advertisement. 7287

CENTRAL ELECTRICITY AUTHORITY

Chief Engineer's Department, Headquarters

APPLICATIONS are invited for the following appointments in the Projects Branch of the Nuclear Power Sub-Department at Bankside House, London, S.E.1.

1. SENIOR ASSISTANT ENGINEERS.
   - (a) Responsible for mechanical work in design and construction of nuclear power stations.
   - (b) Responsible for electrical work in design and construction of nuclear power stations.
   - (c) Responsible for co-ordination and programming in design and construction of nuclear power stations.

Candidates should have sound fundamental training in mechanical and/or electrical engineering as appropriate, and preferably a university degree and/or corporate membership of a senior engineering institution, as well as experience in the design and construction of modern power stations. Knowledge of the basic principles of nuclear energy an advantage.

2. SECOND ASSISTANT ENGINEERS.
3. THIRD ASSISTANT ENGINEERS.

   To join project teams engaged on the design and construction of nuclear power stations.

Candidates should have sound fundamental training in mechanical and/or electrical engineering and preferably a university degree and/or corporate membership of a senior engineering institution, as well as experience in the design and construction of modern power stations. Knowledge of the basic principles of nuclear energy an advantage.

The salaries for the appointments will be within the following scales :—

Senior Assistant Engineer, £1,435-£1,795 p.a.
Second Assistant Engineer, £1,210-£1,570 p.a.
Third Assistant Engineer, £1,105-£1,315 p.a.

Write for application form to D. Moffat, Director of Establishments, Winsley Street, London, W.1. Forms to be completed and returned by 27th September, 1957. Quote Ref. E.R./391. 7370

MECHANICAL AND ELECTRICAL ENGINEERS IN VARIOUS GOVERNMENT DEPARTMENTS

THE CIVIL SERVICE COMMISSIONERS invite applications for pensionable posts in a wide variety of mechanical and electrical engineering duties.

Candidates must be under 35 on 1st January, 1957, with extension for regular service in H.M. Forces and appropriate civil service. For the Post Office they must be at least 21, for the Ministry of Supply, and Ministry of Transport and Civil Aviation (Civil Aviation Organisation) at least 23; for other posts at least 25 on that date.

The achievement of Corporate Membership of one of the professional institutions—Mechanical Engineers, Electrical Engineers, or Civil Engineers is essential for most of the posts but for some posts Associate Fellowship of the Royal Aeronautical Society or (in the Post Office) an Honours Degree in Engineering or Physics will be accepted. Candidates will however be admitted, provisionally, who have passed, or have exemption from, the appropriate sections of the examinations for the stipulated associate membership. Exceptionally a candidate otherwise qualified by evidence of high professional attainment may be admitted. Relevant training and practical experience is expected.

London salary (men) (£805 (at age 25) to £1,250. Starting salary according to age up to £1,085 at 34. Candidates entering below age 25 will start at salaries varying from £595 at age 21 to £720 at age 24. Prospects of promotion to higher grades on salary scales £1,280-£1,720 and £1,780-£2,050. Somewhat lower in the provinces. Women's scales lower but being improved to reach equality with the men's scales by 1961.

Further particulars and application forms from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1, quoting No. S85/87. Application forms should be returned by 30th September, 1957. Earlier applicants may be interviewed before that date. 7384

CENTRAL ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Conditions of service in accordance with N.J.B. Agreement, Schedule A. Salary includes London allowance. Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. an advantage.

ASSISTANT ENGINEER (Shift),
BARKING A/B POWER STATION
(Vacancy No. 57/801).

Applicants should have experience in the operation of E.H.T. switchgear, station auxiliaries and control of large turbo-alternators. Duties of successful applicant will be those of First Assistant to Station Shift Control Engineer in charge of control room. Salary Class L, Grade 12 = £935 plus £88 10s. shift p.a.

ASSISTANT ENGINEER (Stats.),
BATTERSEA POWER STATION
(Vacancy No. 57/802).

Applicants should have ability to compile and present statistical data relating to station operation efficiency. Salary Class L, Grade 17 = £675 p.a.

ASSISTANT SHIFT CHARGE ENGINEERS, BOW POWER STATION
(Vacancy No. 57/803).

Applicants should have served an apprenticeship and obtained H.N.C. in Electrical and/or Mechanical Engineering or equivalent, and should have had experience in the operation of boiler and turbine plant in power stations. Salary Class F, Grade 9 = £830 plus £79 shift p.a.

ASSISTANT ENGINEER (Mechanical),
GROVE ROAD POWER STATION
(Vacancy No. 57/804).

Successful candidates will be required to take charge of drawing office works, lifting tackle tests and records, and to assist generally. Salary Class F, Grade 11 = £725 p.a.

Applications, quoting vacancy number, may be made on form obtainable from Divisional Secretary, Central Electricity Authority, London Division, P.O. Box 136, Generation House, Great Portland Street, London, W.1, and be received within 10 days of this advertisement. 7350

CITY OF SALISBURY, SOUTHERN RHODESIA

Electricity Undertaking

Vacancy for Test Room Assistant (Meters)

APPLICATIONS are invited for the fixed establishment post of TECHNICAL ASSISTANT, GRADE 2, in the Test Section of the above-mentioned undertaking. Salary scale is £1,100 × £50 to £1,250 p.a., commencing salary at the minimum. No cost-of-living or other allowances are payable.

Applicants must be thoroughly experienced in all types of meter testing, particularly high-tension, transformer-operated, polyphase equipments, both kW and kVA, and should be capable of carrying out all duties in connection with a standardising laboratory.

The main duties of this post are :—

- (a) Testing and calibrating high-tension and special types of metering.
- (b) Standardising instruments and sub-standard meters against potentiometer equipment.
- (c) Ratio and phase angle testing of instrument transformers.
- (d) Testing all types of instruments and meters, and general supervision of metering work.

The successful candidate must be able to comply with the requirements of the Immigration Authorities, and will be required to submit to the Council a satisfactory medical certificate of fitness.

Applicants should submit full particulars of their technical education, qualifications (if any), training and experience. Details of age, place of birth, nationality and marital state should be given, and copies of not more than three recent testimonials may be included.

Further particulars regarding conditions of service, leave entitlement, allowances towards travelling and removal expenses, etc., are obtainable from Davis & Soper Ltd., 52 & 54, St. Mary Axe, London, E.C.3, to whom applications must be submitted on or before 27th September, 1957. 7342

NORTH WESTERN ELECTRICITY BOARD

DISTRICT COMMERCIAL ENGINEER, CENTRAL DISTRICT, MANCHESTER.

Duties will include the organisation and control of all commercial staff and functions of the District; supply of information and advice to all classes of consumers on electricity utilisation, tariffs and all matters concerning electricity services; organisation and supervision of contract wiring work and maintenance services on consumers' premises; control of service centres, demonstrations, exhibitions, etc.; organisation and supervision of consumer records.

Corporate Membership of the Institution of Electrical Engineers will be an advantage.

Salary scale £1,435 × £35 to £1,540 p.a., Grade H.2, N.J.B. conditions.

Applications, naming three referees, to Sub-Area Secretary, No. 1 Sub-Area, North Western Electricity Board, Town Hall, Manchester, 2, P.O. Box 493, by 16th September, 1957.

DISTRICT ENGINEER, LEIGH DISTRICT.

The duties will include control of the District engineering and drawing office staffs and responsibility for the construction, operation and maintenance of the 11 and 6.6 kV and L.V. distribution systems (overhead and underground).

Corporate Membership of the Institution of Electrical Engineers will be an advantage.

Salary scale £1,325 × £30 to £1,415 p.a., Grade G.2, N.J.B. conditions.

Applications, naming three referees, to Sub-Area Manager, No. 2 Sub-Area, North Western Electricity Board, 2, St. George's Road, Bolton, by 14th September, 1957. 7357

JOSEPH LUCAS (ELECTRICAL) LTD.

Great King Street, Birmingham

AS a result of expansion of our road vehicle lighting development department to meet the growing demands of the motor industry we have vacancies for

ENGINEERS AND PHYSICISTS

of at least H.N.C. standard to work on the following projects. Experience or knowledge of photometric and electrical instruments desirable.

The design and development of vehicle lighting equipment and in particular the development of optical systems for future projects.

Development work on specific problems related to vehicle lighting equipment and the design of laboratory and factory control equipment for these products.

In addition there are vacancies for SENIOR DESIGNERS required to work in close co-operation with car designers and styling engineers on the design of lighting equipment for new car models. Experience in the design of pressed metal components for large quantity production desirable.

All of these positions carry attractive starting salaries and provide excellent prospects for advancement. Staff pension fund.

Apply in writing, stating age, qualifications and experience, to the Personnel Manager, Joseph Lucas (Electrical) Limited, Great King Street, Birmingham, 19, quoting reference PM/D/156.

127

BRITISH KLOCKNER SWITCHGEAR LIMITED

Chertsey, Surrey

ESTIMATOR for TECHNICAL SALES. Correspondence and capable of preparing control schemes involving automatic motor control gear. Experience essential.

CIRCUIT DIAGRAM DRAUGHTSMAN. Preferably experienced in preparing automatic control gear schemes.

Applicants to have O.N.C. (Electrical). Excellent opportunities with fast growing concern. Pension scheme. Apply to Managing Director, stating experience and present salary. 165

Situations Vacant (continued)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments, all subject to N.J.B. Agreement for Electricity Supply Industry:—

Tees Sub-Area

THIRD ASSISTANT ENGINEER, Planning and Development Section, Sub-Area Headquarters. Applicants should be qualified engineers with extensive experience in all classes of electrical engineering planning and development work. Salary Schedule A, Class K, Grade 10, £935/£995.

FOURTH ASSISTANT COMMERCIAL ENGINEER, Commercial Officer's Department, Sub-Area Headquarters. Salary Schedule A, Class K, Grade 13, £790/£835.

York Sub-Area

SECOND ASSISTANT DISTRICT ENGINEER, Malton District. Salary Schedule A, Class D, Grade 7, £790/£835.

Harrogate Sub-Area

SECOND ASSISTANT ENGINEER, Construction Section (Survey), Sub-Area Headquarters.

Applicants should preferably have a technical qualification leading to the Corporate Membership of I.E.E. and basic knowledge of H.V. and L.V. overhead line design and construction methods. Experience in surveying of overhead line and cable routes, including preparation of erection schedules, essential. Salary Schedule A, Class G, Grade 7, £935/£995.

Applications stating age, qualification and experience to be received by Assistant Secretary (Establishments), North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 7392

SOUTH EASTERN ELECTRICITY BOARD

SENIOR DRAUGHTSMAN (Engineering), Dorking and Epsom District.

Salary £760 × £20 to £860 p.a. under Schedule D, Grade 5 of the N.J.B. Agreement. Superannuable. Applicants of good general education, are expected to have had some practical engineering experience or technical training and must be capable of taking charge of a district drawing office, including the preparation of engineering drawings, if required, and the keeping of mains records.

Applications, naming two referees, on forms from C. L. B. White, District Manager, SEEBOARD, 56, South Street, Dorking, Surrey, by 18th September, 1957.

SALES REPRESENTATIVE,
Twickenham and Richmond District.

Salary £615 × £20 to £675 p.a. plus £40 London weighting under N.J.C. Grade 2. Superannuable. The person appointed will be engaged mainly on outside sales to domestic, commercial and smaller industrial consumers; he must be able to give advice on supply matters and tariffs and to estimate for small wiring extensions. Applicants must be thoroughly conversant with all types of electrical appliances and in addition to acting as outside representative must be prepared to carry out general showroom duties in any showroom within the Twickenham and Richmond District.

Applications, naming two referees, on forms from J. D. Parkinson, A.M.I.E.E., A.I.Mech.E., Twickenham and Richmond Manager, SEEBOARD, 42, York Street, Twickenham, Middlesex, by 18th September, 1957.

A. L. BURNELL,
Secretary.
7393

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

FOURTH ASSISTANT ENGINEER (Planning) required at the Board's No. 2 Sub-Area Headquarters, Sandiway House, near Northwich, Cheshire. Salary within range £790/£835 per annum (N.J.B. K/13).

Applicants should have had experience in overhead and underground distribution work. Preference will be given to candidates who possess the Higher National Certificate in Electrical Engineering.

Appointment subject to medical examination. Pension scheme.

Application forms obtainable from the Manager at the above address. Closing date 17th September, 1957. 7389

SOUTH OF SCOTLAND ELECTRICITY BOARD

Edinburgh and Borders Area

Third Assistant Engineer (Planning and Development)

APPLICATIONS are invited for the position of THIRD ASSISTANT ENGINEER (Planning and Development) at Area Headquarters, Dewar Place, Edinburgh.

Applicants should have a sound engineering training with subsequent experience in the design and layout of large distribution systems at pressures up to and including 33 kV in a densely loaded and residential area. A knowledge of the application of modern protective equipment and of the calculation of fault levels and preparation of load flow diagrams would be an advantage.

Applicants must also possess, as a minimum qualification, a Higher National Certificate in Electrical Engineering or its equivalent.

Salary scale N.J.B. Schedule A, Class K, Grade 10, £935/£995 per annum.

The successful candidate will require to reside within a reasonable distance of Area Headquarters.

Applications on the standard form, obtainable from the undersigned, should be submitted not later than 27th September, 1957.

C. H. A. COLLYNS,
52, Melville Street, Manager.
Edinburgh, 3.
26th August, 1957. 7358

CENTRAL ELECTRICITY AUTHORITY

North Eastern Division

Generation (Construction) Department

APPLICATIONS are invited for the following appointments in the Generation (Construction) Department at Divisional Headquarters, Newcastle upon Tyne :—

(a) SENIOR ASSISTANT ENGINEER (Mechanical).
Salary N.J.B. Schedule B, Grade 1 (£1,330-£1,560 per annum).

(b) SECOND ASSISTANT ENGINEER (Mechanical).
Salary N.J.B. Schedule B, Grade 2 (£1,145-£1,375 per annum).

Candidates should have received a first-class technical education and should preferably hold a recognised mechanical engineering degree or be a corporate member of one of the professional institutions. Applicants for appointment (a) should also have a thorough knowledge of the design, construction and operation of generating stations, and for appointment (b) they should have good experience in mechanical engineering design and construction.

Forms of application may be obtained from Divisional Establishments Officer, Central Electricity Authority, North Eastern Division, Carliol House, Newcastle upon Tyne, 1, to whom they should be returned to arrive not later than 23rd September, 1957. 7341

SOUTH WALES ELECTRICITY BOARD

BUILDING AND CIVIL ENGINEERING ASSISTANT required on the staff of the Board's Civil Engineer.

The successful candidate will be based at Tenby and will be responsible for building and civil engineering work in the western part of the Board's area. He must be capable of using his own initiative and will be required to reside in the area.

Duties will include the preparation of building details, levelling and surveys for drawing office use, the superintending of a small direct labour force and independent contractors in connection with the erection and alteration of substations, showrooms, offices, etc., for which a full knowledge of all classes of building trades and methods is essential.

Salary Class AX/DX, Grade 6 (£710/£910) of the N.J.B. Schedule, commencing salary according to experience and ability.

Applications stating age, present position and salary, qualifications, experience, and three referees, should be addressed to the Secretary (Establishments Section), St. Mellons, Cardiff, so as to reach him not later than Monday, 23rd September, 1957. 7339

CENTRAL ELECTRICITY AUTHORITY

South Eastern Division

SECOND ASSISTANT ENGINEER to take charge of a new district to be based at Canterbury. This district will include the Channel Cable connection as well as normal 275-kV and 132-kV equipment. The successful candidate will be responsible for the administration of all construction, operation and maintenance work within this district.

This district will be formed with effect from 1st April, 1958, but this appointment will be filled as soon as possible, and the successful candidate must be prepared to spend his time before the 1st April, 1958, gaining experience in the existing districts at Croydon, Brighton and Gravesend and at Divisional Headquarters, Kingston.

Applicants should be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualification and must have had extensive experience of 132-kV (and preferably 275-kV) transmission work both maintenance and construction.

Experience of joint consultation and negotiating machinery is advantageous and evidence must be produced of administrative abiltiy.

Salary Class AX/DX, Grade 2, £1,145-£1,375 per annum.

Applications, giving details of education, present position, experience, etc., should be forwarded to the Establishments Officer, Central Electricity House, Lower Ham Road, Kingston upon Thames, so as to arrive by 14th September, 1957, quoting reference (305). 7380

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments. The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Northmet Sub-Area, Stevenage District

TWO THIRD ASSISTANT ENGINEERS (Ref. 706) (117/57.R).

Candidates should have had a sound technical training and suitable experience in the construction, operation and maintenance of H.V. and L.V. distribution systems including substations.

Salary N.J.B. Class F, Grade 9 (£790-£835).

Apply by letter to H. L. Sumner, Manager, Eastern Electricity Board, Walkern Road, Stevenage, Herts, by 16th September, 1957.

Suffolk Sub-Area, Stowmarket District

COMMERCIAL ASSISTANT (115/57.N).

Candidates should have had a sound training and subsequent experience in commercial development work in a rural area. Ability to assist in the preparation of estimates for all types of industrial, agricultural and domestic installations is essential as well as a good working knowledge of the general duties attaching to a district commercial department.

Salary N.J.C. Grade 3 (£680-£740).

Apply by letter to the Manager, Stowmarket District, Eastern Electricity Board, Electricity Offices, Ipswich Road, Stowmarket, Suffolk, by 20th September, 1957. 7383

SOUTH OF SCOTLAND ELECTRICITY BOARD

APPLICATIONS are invited for the position of PRINCIPAL ASSISTANT in the Chief Commercial Officer's Department at Board Headquarters, presently located at Glasgow.

Applicants should possess good general experience of all branches of advertising, copy writing and production of sales literature and brochures. The ability to write precise descriptive matter and articles dealing with the utilisation of electricity are essential qualifications. Knowledge of the electricity supply industry would be an advantage.

Salary and conditions in accordance with Grade 7 (£1,035/£1,125) of the National Joint Council (Administrative and Clerical Grades) Agreement. The position is superannuable.

Applications should be submitted on the standard form, which may be obtained from the undersigned, and should reach this office not later than Saturday, 21st September, 1957. Please quote reference No. C4/57.

ANDREW A. WALLACE,
Secretary.

P.O. Box No. 173,
351, Sauchiehall Street,
Glasgow, C.2.
26th August, 1957. 7348

CENTRAL ELECTRICITY AUTHORITY

North Eastern Division

Appointment of Third Assistant Engineer, Technical Department (Protective Gear and Electrical Plant Testing)

APPLICATIONS are invited for the above appointment with headquarters at Close Power Station, Newcastle upon Tyne.

Applicants should possess qualifications of at least Graduate I.E.E. standard and have had experience in the commissioning and maintenance of protective gear and the testing of large electrical plant.

The salary for this appointment (which is superannuable) will be in accordance with the National Joint Board Agreement, Schedule B, Grade 3 (£1,055-£1,285 per annum) and will commence at a point commensurate with qualifications and experience.

Forms of application may be obtained from the Divisional Establishments Officer, Central Electricity Authority, North Eastern Division, Carliol House, Newcastle upon Tyne, 1, to whom they should be returned to arrive not later than 20th September, 1957. 7369

SENIOR LECTURER IN ELECTRICAL ENGINEERING

APPLICATIONS are invited by the Foreign Office for the post of SENIOR LECTURER IN ELECTRICAL ENGINEERING at the University of Rangoon, Burma, under the Technical Co-operation Scheme of the Colombo Plan. Will be required to teach electrical engineering up to degree standard and to set up high-voltage and electric machines laboratories. Should have at least an M.Sc. and must have had at least five years' experience of teaching and laboratory work at a British university. Should also have had experience of high-voltage practice. Duration two years.

Salary £1,750 p.a. (subject to U.K. income tax) plus tax-free oversea allowance of £1,743 p.a. (married) or £913 p.a. (single) plus other allowances. Furnished married accommodation provided. Contract with the U.K. Government.

For further information and application forms write Ministry of Labour and National Service (E9), Almack House, King Street, London, S.W.1, quoting A12/BUR/TCS/88. 7340

CENTRAL ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for an appointment of FOURTH ASSISTANT ENGINEER in the System Operation Department in the Leeds area.

Commencing salary within the range £710-£835 per annum, Grade 6, Class AX, National Joint Board Agreement (Schedule B), according to qualifications and experience, rising to an ultimate maximum of £935 per annum (Class EX), plus 10% shift allowance.

The position involves shift duties of a general technical and statistical nature in connection with system operation and control. Preference will be given to candidates who hold the Higher National Certificate in Electrical Engineering or equivalent qualifications. Experience in a generating station will be an advantage.

Application forms obtainable from the Divisional Secretary (Establishments), Central Electricity House, St. Mary's Road, Leeds, 7, to be returned within 14 days of the appearance of this advertisement. 7378

ST. HELENS TECHNICAL COLLEGE

Principal: Dr. T. E. A. K. Jackson, M.A.(Oxon)

APPLICATIONS are invited for the posts of SENIOR LECTURER (£1,350-£1,550) and LECTURER (£1,200 - £1,350) in Electrical Engineering. Applicants should have high academic qualifications and industrial experience, either in the light or heavy current fields, and should be competent to prepare students for the Part III examinations of the I.E.E.

Application forms may be obtained from the undersigned, to whom they should be returned by 20th September.

N. F. NEWBURY,
Director of Education.

Education Office,
St. Helens. 7391

ROYAL TECHNICAL COLLEGE, SALFORD

A HEAD OF THE ELECTRICAL ENGINEERING DEPARTMENT is required as soon as possible.

Candidates should be Honours Graduates and Corporate Members of the Institution of Electrical Engineers, and should be able to offer experience, e.g., teaching, administrative, industrial, research, which will be suitable to enable them to undertake the development of a growing department and also the supervision of its transfer to new premises.

The salary attached to the post is that of a Grade VI Head of Department of the Burnham (Technical) Report, 1956, i.e., £2,050 × £50 to £2,250 per annum.

Forms of application, together with further revised particulars of the post, may be obtained from the Acting Principal, Royal Technical College, Salford, 5, to whom they should be returned by 14th September, 1957.

R. RIBBLESDALE THORNTON,
Clerk to the Governors.

7330

NUCLEAR ENGINEERS

for

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL.

TO simulate aspects of future Nuclear Power Systems, "in pile" experiments are placed in High Flux Research Reactors. The engineering of these experiments calls for inventive design and knowledge of mechanisms, machinery, optics, heat transfer, chemical plant, pumped circuits, process instrumentation, stress work, electrical devices and nuclear effects.

Qualified engineers interested in this work will receive comprehensive training whilst on the job and will obtain an insight into the design problems of newest reactor technologies.

Housing, superannuation and other excellent conditions.

Salary: Engineer II, £1,300 - £1,740.
Engineer III, £815 - £1,270.

Send POSTCARD by 11th October, 1957, for further information and an application form to Recruitment (898Y/48), A.E.R.E., Harwell, Didcot, Berks. 7329

CENTRAL ELECTRICITY AUTHORITY

North Eastern Division

Appointment of Station Chemist, Darlington Power Station

APPLICATIONS are invited for the appointment of STATION CHEMIST at Darlington Power Station.

Applicants should possess at least a Higher National Certificate in Chemistry, have good experience in modern analytical and physical chemistry, and be conversant with boiler and feed water treatment.

The salary for this appointment (which is superannuable) will be in accordance with the National Joint Board Agreement, Schedule A, Grade 7, Class F (£885-£930 per annum).

Forms of application may be obtained from Divisional Establishments Officer, Central Electricity Authority, North Eastern Division, Carliol House, Newcastle upon Tyne, to whom they should be returned to arrive not later than 19th September, 1957. 7354

SENIOR AND JUNIOR ENGINEERS

are required immediately for interesting work in connection with an intensive development programme which is being undertaken by an electrical firm in the North West of England.

The programme includes measuring instruments and protective and control relays. Openings are available both in the design and application sections.

Applicants should have a degree or a Higher National Certificate, or equivalent, in electrical engineering, and whilst experience is desirable, training will be given to suitable applicants.

Salaries, commensurate to those paid elsewhere to professional engineers, will be in accordance with age and experience, and they are reviewed frequently.

These positions are permanent and the amenities include good canteen facilities, medical services and an excellent contributory pension and life assurance scheme.

Applicants should write in confidence, giving full particulars of age, experience and qualifications to—Box 7372.

LEO COMPUTERS LIMITED

ELECTRICAL DESIGN ENGINEER

A VACANCY exists for an Electrical Engineer to undertake design of the power supply equipment used in a large-scale digital computer. Experience in any of the following would be an advantage:—

Electrical installation.
Rectifier sets.
Low-power alternators.
Small switchgear and interlocking circuits.

This position is permanent and pensionable and offers good opportunities for an engineer wishing to enter this challenging field.

Applicants should have H.N.C. or equivalent qualification. Commencing salary £600-£1,000 p.a., according to experience.

Write to—

The Personnel Officer,
LEO COMPUTERS LTD.
38/42, Minerva Road, London, N.W.10

7261

WORKSHOP INSTRUCTOR (ELECTRICAL INSTALLATION)

required by the GOVERNMENT OF CYPRUS Education Department for one or two tours of 21 months either (i) on agreement with prospect of permanent and pensionable employment or (ii) on contract with gratuity at rate of £100 a year. Salary scale (including overseas allowance and present temporary allowance of 18% of salary) £993 rising to £1,366 a year. Outfit allowance £30. Free passages. Education grant payable in certain circumstances. Liberal leave.

Candidates must have served an apprenticeship to electrical engineering, have had subsequent experience and possess a C. and G. Full Technological Certificate in Electrical Installation Work and preferably in Electrical Engineering Practice.

Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/42421/EF. 7394

NORTH THAMES GAS BOARD

ASSISTANT ENGINEER (Electrical) required at the Board's works at Beckton, East Ham, London, E.6.

Candidates should be not more than 40 years of age and should be Corporate Members of the Institution of Electrical Engineers, having had supervisory experience with the installation and operation of heavy industrial equipment, including generation high voltage distribution and large industrial motors. A knowledge of the application of electronics in industry would be an advantage.

Starting salary will be in the region of £1,100 per annum according to age and experience.

The successful candidate will be required to join the staff pension scheme.

Applications giving full details to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, quoting reference ER/414. 7385

CENTRAL ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 141/57

APPLICATIONS invited for superannuable N.J.B. appointment of STATION SHIFT CONTROL ENGINEER, TIR JOHN POWER STATION, SWANSEA.

Salary H.10 (£835-£880 per annum).

H.N.C. or equivalent qualification desirable.

Application forms obtainable from Secretary, South Wales Division, Central Electricity Authority, Twyn-y-fedwen Road, Gabalfa, Cardiff, to be returned by 16th September, 1957. 29th August, 1957. 7379

YOUNG ENGINEERS

interested in gaining experience of the erection of lattice tower, concrete and wood pole overhead transmission lines and willing to serve either at home or overseas. Some technical background up to H.N.C. (Civil and Structural) standard desirable, but previous experience of this kind of work not essential. Pension fund.

Write giving full particulars and quoting ref. C/76/55 to Staff Officer, British Insulated Callender's Construction Co. Ltd., 30, Leicester Square, London, W.C.2.

175

***Situations Vacant** (continued)*

READING TECHNICAL COLLEGE

LABORATORY DEMONSTRATORS (2) required in Department of Engineering for September next.

(a) MECHANICAL and PRODUCTION ENGINEERING.

(b) ELECTRICAL ENGINEERING (light current).

Good industrial training and practical experience necessary. Salary, dependent on qualifications and experience, between £550 and £800 per annum.

Main duties include assisting with laboratory classes, supervision, installation and development of equipment.

Further particulars and application forms, returnable by 23rd September, obtainable from Chief Education Officer, Reading Education Committee, Education Office, Blagrave Street, Reading. 7356

CENTRAL ELECTRICITY AUTHORITY

Midlands Division

BOILER HOUSE SHIFT CHARGE ENGINEERS are required at Nechells "A" Power Station, off Aston Church Road, Birmingham, 7. N.J.B. service conditions, superannuable appointments, salary within Schedule A, Grade G9, £835 × £15 to £880 per annum plus 10% shift allowance.

A sound technical training and practical experience in the operation and maintenance of steam generating plant and main switchgear are required. Appropriate technical qualifications will be an advantage.

Apply, quoting Vacancy No. 625MD, on form AE6, available from the Establishments Officer, 53, Wake Green Rd., Moseley, Birmingham, 13, by 18th September, 1957.

R. L. BATLEY,
Divisional Controller.
7352

CENTRAL ELECTRICITY AUTHORITY

Headquarters

SENIOR ASSISTANT SURVEYOR required in London. This is a permanent pensionable post. Salary provisionally within scale £1,560-£1,760 p.a.

The duties include dealing with agricultural and estate agency problems arising during the wayleaving and erection of grid lines. Candidates should have qualified for membership of the Royal Institution of Chartered Surveyors (Land Agency), the Land Agents Society or the Chartered Auctioneers and Estate Agents Institute. They should have sound general experience of estate management, agriculture and forestry.

Applications, stating age, present position and salary, and giving full details of experience, should be forwarded to D. Moffat, Director of Establishments, Central Electricity Authority, Winsley Street, London, W.1, by 21st September. Quote Ref. E.R./386. 7355

CENTRAL ELECTRICITY AUTHORITY

North West, Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of SHIFT CHARGE ENGINEER at the Stockport Power Station. Salary F.7, £885/£930 plus 10% shift allowance. Superannuable. H.N.C. (mechanical or electrical) desirable.

Application forms from Director of Labour and Welfare, Central Electricity House, 825, Wilmslow Road, Manchester, 20, to be returned before 11th September, 1957. Quote Vacancy No. E/224/347/R. 7331

VENNER LIMITED

ELECTRICAL ENGINEERS (Laboratory) required with experience in development of electro-mechanical instruments. Time-switch experience an advantage.

Salaries and conditions for these staff vacancies are in line with the responsibilities involved, and there is a pension scheme.

Fully detailed applications should be addressed to Personnel Manager, VENNER LIMITED, Kingston By-pass, New Malden, Surrey. 7338

LONDON ELECTRICITY BOARD

Engineering Draughtsman

APPLICATIONS are invited for the above position in the Board's Northern District at Hackney, London, E.5.

Applicants should have had experience in mains recording with a public utility authority, preferably with an electricity board, and be able to obtain particulars on site and compile accurate permanent records. Some knowledge of electrical plant layout, building construction and simple reinforced concrete structures would be an additional advantage.

The post is graded under Schedule D of the National Joint Board Agreement as Grade 6, £635 to £755 per annum inclusive of London allowance.

Application forms obtainable from Personnel Officer, 46, New Broad Street, London, E.C.2, to be returned completed by 14th September, 1957. Please quote ref. PER/2368/R. 7297

CENTRAL ELECTRICITY AUTHORITY

Midlands Division

FOURTH ASSISTANT ENGINEER is required in the Protective Gear Section of the Technical Department. N.J.B. service conditions, superannuable appointment, salary within Schedule B, Grade 6, commencing in range £710-£835, ultimately rising to £935 per annum.

A university degree, Higher National Certificate or equivalent qualification is desirable. Some knowledge of protective gear is required, and preferably experience with a switchgear manufacturer.

Apply, quoting Vacancy No. 628MD, on form AE6, available from the Establishments Officer, 53, Wake Green Rd., Moseley, Birmingham, 13, by 18th September, 1957.

R. L. BATLEY,
Divisional Controller.
7353

MIDLANDS ELECTRICITY BOARD

THIRD ASSISTANT DISTRICT ENGINEER required in the Lichfield District of the Wolverhampton and District Sub-Area.

Applicants should have had experience in all branches of distribution work, including construction, operation and maintenance of medium and high-voltage underground cables, overhead lines and substations, and the maintenance and testing of switchgear up to 11 kV. Technical qualifications desirable.

Salary £740/£785 per annum (N.J.B. Grade E.9). Superannuable.

Apply by letter within fourteen days, stating age, qualifications, experience, present position and salary, to Mr. D. Holt, Sub-Area Manager, Midlands Electricity Board, 83, Darlington St., Wolverhampton.

A. STEPHENS,
Secretary. 7404

SALES ENGINEERS

JOHNSON & PHILLIPS invite applications from men with suitable experience for positions as TECHNICAL ENGINEERS to sell one or more of the undermentioned products, principally to industrial and trade purchasers :—

CABLES.
CAPACITORS.
SWITCHGEAR.
TRANSFORMERS.

There are vacancies at Birmingham, Glasgow and Manchester branches.

Applications giving details of qualifications, experience and salary grouping, and indicating the preferred area, should be sent to the Sales Director, c/o Employment Department, Johnson & Phillips Ltd., Victoria Way, Charlton, London, S.E.7. 7192

MAWDSLEY'S LTD.

Dursley, Glos.

invite applications for the post of
TECHNICAL SALES ENGINEER

in the Midlands area. Basic and supplementary pension scheme. Specialised rotating electrical machines, D.C. or A.C., 1-300 kW.

Particulars required: age, education and technical training. Subsequent experience. Initial remuneration desired. 7267

SOUTHERN ELECTRICITY BOARD

Demonstrator

NEWBURY District of No. 2 (Newbury) Sub-Area. Salary N.J.C. Grade 1 (£500-£600 per annum). N.J.C. conditions of service.

Applicants should be qualified to advise generally on the utilisation of electric domestic appliances, to give public demonstrations of apparatus and to assist in showroom duties. The possession of an E.A.W. Certificate or equivalent domestic science qualification would be an advantage.

The successful candidate will be required to contribute to the Central Electricity Authority and Area Boards (Staff) Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, and returned to him in envelopes suitably endorsed not later than 16th September, 1957. 7386

COVENTRY CORPORATION

(a) ASSISTANT ELECTRICAL ENGINEERS with experience design and supervision lighting and power installations in schools or other large buildings.

(b) ASSISTANT LIGHTING ENGINEERS with experience street lighting, decorative lighting and traffic control equipment. Experience maintenance public lighting and domestic and industrial electrical installations by direct labour desirable.

Qualifications preferred: Grad. M.I.E.E. (and Assoc. Member A.P.L.E. for post (b)).

Grade, if qualified, £750 to £1,030. £26 local award paid in addition to salaries up to £795 in approved circumstances. Housing accommodation may be available. Removal expenses loan available.

Application forms from City Engineer, Council House, Coventry, returnable by 16th September, 1957. 7349

BIRKENHEAD EDUCATION COMMITTEE

BIRKENHEAD TECHNICAL COLLEGE
Principal: C. V. Vinten Fenton, M.Sc., A.M.I.Mech.E., A.M.I.E.E.

APPLICATIONS are invited for the following appointment to the full-time staff: SENIOR LECTURER IN ELECTRONIC ENGINEERING in the Electrical Engineering Department.

Salary in accordance with the Burnham Technical Report, 1956.

Further particulars and forms of application may be obtained from the undersigned, to whom completed applications should be returned by 20th September, 1957.

H. GLYN WILKINSON,
Director of Education.
63, Hamilton Square,
Birkenhead. 7332

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

ASSISTANT CONSUMERS' ENGINEER (2) required in the Southport District of the Board's No. 1 Sub-Area. Salary within range £540/£585 per annum (N.J.B. E/13).

Duties include estimating for contracting work and advising consumers on electricity supply matters and appliances. Applicants should preferably have the Ordinary National Certificate in Electrical Engineering or equivalent qualification.

Appointment subject to medical examination. Pension scheme.

Standard application forms should be forwarded to the Manager, No. 1 Sub-Area, 24, Hatton Garden, Liverpool, 3, not later than 21st September, 1957. 7388

SENIOR TECHNICAL SALES ENGINEERS

required to introduce and sell fluid power transmission equipment to those manufacturers who make and want the best.

Applicants should have matriculation standard, have good engineering background, possess intimate knowledge of mechanical processes combined with electrical drives and transmissions; age approx. 40.

Give full details of education, qualifications and experience, stating branch of industries and firms concerned and present salary.—Box 7229.

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

ASSISTANT SECTION ENGINEERS required in the St. Helens and Northwich Districts of the Board's No. 2 Sub-Area.

(a) ST. HELENS: Salary within range £790/£835 per annum (N.J.B. F/9).

(b) NORTHWICH: Salary within range £740/£785 per annum (N.J.B. E/9).

Applicants should have had experience in H.T. and L.T. overhead and underground distribution work. Technical qualifications desirable.

Appointments subject to medical examination. Pension scheme.

Application forms obtainable from the Manager, No. 2 Sub-Area, Sandiway House, near Northwich, Cheshire. Closing date, 14th September, 1957. 7347

SOUTH WESTERN ELECTRICITY BOARD

Cornwall Sub-Area

SECOND ASSISTANT ENGINEER (Construction). Salary N.J.B. H.7 (£995/£1,055 per annum).

The successful candidate will be required to assist in the organisation and supervision of the Sub-Area Construction Department and he may be required to undertake emergency duties on the basis of general availability.

Previous experience of all types of o/h line constructions and substations up to and including 33 kV, and possession of current driving licence essential. Technical qualifications at least equivalent to H.N.C. desirable.

Applications on standard form AE6/ACT, obtainable from Manager, Cornwall Sub-Area, S.W.E.B., Pool, Redruth, should be returned by 17th September, 1957. 7368

TRANSFORMER DRAUGHTSMEN

SENIOR and JUNIOR DRAUGHTSMEN with experience on power transformers in range 5 to 10,000 kVA required. Permanent positions offering good salary according to experience. Pension, life assurance scheme, etc. Evening and Saturday interviews can be arranged.

Write stating age, experience and qualifications to:—

Chief Engineer,
BRYCE ELECTRIC CONSTRUCTION CO. LTD.,
Kelvin Works, Hackbridge, Wallington, Surrey.
7317

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SECTION ENGINEER required at Blaenau Ffestiniog, in the Caernarvon District. Salary within range £835/£880 per annum (N.J.B. E/7).

Applicants should have had experience in the construction and operation of E.H.T., H.T. and L.T. overhead and underground distribution systems, including indoor and outdoor substation equipment. Technical qualifications desirable.

Appointment subject to medical examination. Pension scheme.

Application forms obtainable from the Manager, No. 4 Sub-Area, Electricity House, Rhostyllen, Nr. Wrexham. Closing date 21st September, 1957. 7387

COLLEGE OF TECHNOLOGY BIRMINGHAM

(Designated College of Advanced Technology)

APPLICATIONS are invited for the post of LECTURER in ELECTRICAL ENGINEERING.

Salary will be in accordance with the Burnham (Further Education) Scale as follows:—

Lecturers (men) £1,200 × £30 to £1,350.

Further particulars and application forms from the Registrar, College of Technology, Birmingham, 1, on receipt of stamped addressed foolscap envelope. Applications to be received within 18 days of the appearance of this advertisement.

K. R. PILLING,
Clerk to the Governing Body.
7382

THURROCK TECHNICAL COLLEGE

Grays, Essex

REQUIRED as soon as possible, ASSISTANT GRADE B capable of teaching City and Guilds of London Institute Electrical Installations Course and of taking charge of the Electrical Installations Workshop.

Salary £650 × £25 to £1,025 with additions for degree or equivalent qualification and approved training. Increments within the scale for previous teaching service, approved industrial experience and War/National Service.

Details and application forms obtainable from the Clerk to the Governors, Upminster Court, Hall Lane, Upminster. 7381

AN engineer representative required in the Yorkshire area for the sale of switchgear, fuse distribution gear and accessories. Applicants should have sound electrical knowledge and sales experience. A connection amongst industrial users, contractors and wholesalers in the area is desirable. Car provided. Full details of experience, salary required, etc., to Wm. Sanders & Co. (Wednesbury) Ltd., Wednesbury, Staffs. 7373

ARMATURE winder required with ability to supervise small repair shop. N.E. London area.—Box 7318.

ASSISTANT electrical engineer and electrical draughtsman required for electrical installations in buildings. Engineer should possess H.N.C., draughtsman O.N.C. Consulting engineers' office, Victoria Street, London.—Box 9096.

ASSISTANT technical manager required by company engaged in the manufacture of rubber and thermoplastic cables. Applicants should preferably be graduates in electrical engineering or physics or hold equivalent qualifications, and should have previous experience in the electrical cable industry. Applications, giving age, qualifications, experience and salary required, to be addressed to Personnel Officer, St. Helens Cable & Rubber Co. Ltd., Trading Estate, Slough, Bucks. 7271

BOOTS PURE DRUG Co. Ltd., require two electrical engineering draughtsmen, age 25-30 years. Commencing salary up to £750 per annum according to qualifications and experience. Five-day week, superannuation scheme. Applications in writing to—Personnel Manager, Station Street, Nottingham. 7395

CIRCUIT draughtsmen required by firm manufacturing industrial control equipment. Commencing salaries up to £800 per annum for first-class men, but some less experienced draughtsmen required. Canteen facilities, pension scheme, holiday commitments recognised. Housing assistance later to approved cases. West Middlesex area. Write giving age, experience and full details to Box 7125.

COUNTER assistant required for electrical department. Please state experience and wages required.—Farmer, Stedall & Co., 145/157, St. John Street, London, E.C.1. 7374

CROMPTON PARKINSON (Works) Ltd. offer opportunities of progressive and permanent employment in their Bombay works to qualified production engineers and production supervisors of Indian nationality. Products are light and medium electrical rotating plant and switchgear. Applicants should have good practical experience in one or both of these lines. The works have been in operation for many years and are expanding rapidly, thus the opportunities now being offered are particularly attractive. Preliminary interviews will take place in London. Applications, which will be regarded as strictly confidential, should mention age, together with full details of education, training, experience, responsibilities and salaries received, and should be sent in writing to Ref. MD/P, Crompton Parkinson Limited, Crompton House, Aldwych, London, W.C.2. 7343

DESIGNER draughtsmen, age 25-40, required by electrical control gear manufacturers in South East England. A sound technical knowledge and practical experience in design of contactors and relays are essential. Staff pension scheme, five-day week, salary in accordance with age and experience. Applications in writing, stating qualifications, experience and salary required, should be sent to—Box 7396.

EAST Africa. Supervising engineer required for leading electrical contractor. Must be experienced in estimating and design of electrical installations. Write stating age and experience.—Box 7172.

DRAUGHTSMEN. Excellent opportunities offered to electrical/mechanical draughtsmen. Established expanding company specialising in contactors, control panels and test rigs. 37½-hour week, two weeks' paid holiday after 10 months and sickness scheme. Write giving full details and salary expected.—Box 7211.

DRAWING office of London manufacturers offers £1,000 per annum starting salary to senior draughtsman who is well acquainted with motors, generators, alternators, rotary converters and rotary transformers up to about 15 kW. Good conditions, superannuation scheme and canteen. Permanent position. Write—Box 7250.

ELECTRICAL and instrument engineer required by rubber and plastics manufacturers. This appointment calls for a wide knowledge and practical experience of electrical and control instruments employed on rubber and plastics manufacturing machinery of all kinds. The appointment carries an attractive salary, and a non-contributory staff pension and life insurance scheme is in operation. Applications, which will be treated in strict confidence, should be addressed to the Secretary, Rubber Improvement Limited, Rilex Works, Wellingborough, Northants. 7359

ELECTRICAL and mechanical engineers have capacity for design and/or development and production of components or complete equipment. Advertisers, A.I.D. approved, are sub-contractors to many well-known firms, Ministry of Supply, Admiralty, etc. — Service Electric Co. Ltd., Stanmore, Middx. (Edgware 5566). 7344

ELECTRICAL contractor requires right hand assistant to director. Estimating, work getting, running and all duties up to final bill. Possibility of further advancement to director's level for right man with drive and initiative, Lowestoft area. Apply in confidence to Director, stating age, experience, commencing salary.—Box 9109.

ELECTRICAL contractors require experienced estimating and supervising engineer, Leeds area. Reply stating age, experience and salary required.—Box 9110.

ELECTRICAL engineer, male, fully qualified and with experience in maintenance and new work installation and instrumentation, required by Morgan Refractories Ltd., Liverpool Rd., Neston, Wirral. 5-day week, canteen, pension scheme. Application forms from the Staff Manager. 7256

ELECTRICAL firm with retail showroom and small contracting business of good standing requires capable electrician with high standards of service; able to drive. London. Good prospects for keen man prepared to train for responsible position. State age and details of career.—Box 9108.

ELECTRICAL installation engineer. Estimating, planning and supervision. Write giving details of experience, etc., to—Priory Electric Service (Coventry), Ltd., 3, Lower Ford Street, Coventry. 7397

ELECTRICAL sales engineer required for London and Home Counties. Experienced man preferred but consideration given to representative with genuine urge to sell motors and control gear. Write stating full particulars to—Box 7274.

ELECTRICAL tester, transformer experience preferred but not essential, and suitable technical qualification.—Gresham Transformers Ltd., Hanworth, Middx. 7345

ELECTRICIAN with H.N.C. in electrical engineering or equal technical training to assist with and later take charge of development and production of electrical heat exchangers. Some coil winding experience and able to prepare own wiring diagrams. 6s. 3d. per hour to commence. Please write stating age, qualifications, experience and posts held.—Hupfield Plant Limited, Engineers & Exporters, Willow Lane, Mitcham, Surrey. 7333

ESTIMATING. E. K. Cole Limited, Malmesbury, Wilts, have a vacancy for an estimator. The company is engaged on electronic equipment, and applicants should have had a wide experience in estimating this class of work and small quantity production. Good practical shop training is considered essential and an engineering apprenticeship desirable. Good salary will be offered and there is a possibility of housing accommodation being available to suitable applicants. Full welfare facilities and contributory pension scheme. Please apply in writing with details of education, training and experience to—Personnel Manager. 7276

Situations Vacant (continued)

ESTIMATING engineer required, used to A.C. and D.C. switchgear, open and enclosed pattern switchboards. Apply to—Whipp & Bourne Ltd., Switchgear Works, Castleton, Rochdale. 7360

FIRST-class sales representative for Greater London area. Apply with details of personal history and qualifications to — Sales Manager, Berry's Electric Ltd., 86, Newman Street, London, W.1. 7334

FOREMAN supervisor electrician required for factory, commercial and domestic installations. Write giving details of experience, etc., to—Priory Electric Service (Coventry), Ltd., 3, Lower Ford Street, Coventry. 7398

FOREMAN winder to take entire charge of established repair shop. Write giving details of experience, etc., to—Priory Electric Service (Coventry), Ltd., 3, Lower Ford Street, Coventry. 7399

JOINTER, first-class cable, fully experienced H.T. and telephone work, required by large London firm electrical engineers. Excellent opportunity. Write experience, references.—Box 7248.

JUNIOR engineers required for the supervising of cable installation contracts throughout the country. Applicants must be capable of controlling rough labour and jointing staff, and taking as laid sketches to customers' requirements. Apply—Box 7230.

MANAGER assistant, 25-35 years, required by electrical contractor (med. size) engaged on building installations, to handle all internal technical and office procedures. Good draughtsman able to prepare schematic layouts and experienced estimating, buying, etc. Pension scheme. Excellent opportunity. State age, experience and salary required.—Box 7400.

OVERHEAD linesmen required for wood pole H.T. and L.V. overhead lines in North East England. Permanency for conscientious men. Overtime and country allowance where applicable. Write giving particulars of experience, etc.—Graham Bros. (Electrical Engineers) Ltd., Zetland Place, Middlesbrough. 7236

RESIDENT civil engineer, assistant resident civil engineer and senior quantity surveyor required for new power station site at Padiham, Lancashire. Engagement for duration of construction. Applicants for R.C.E. to be A.M.I.C.E. or M.I.C.E. Write stating experience and salary required, to—C. S. Allott & Son, 1, North Parade, Manchester, 3. 7401

SALES engineer required for Midland area by Birmingham firm of control gear makers. Age 25-35. Must have had works apprentice training and hold as a minimum O.N.C. (electrical). Car provided. Attractive salary and working conditions. Write stating age, experience and salary required to—Box 7362.

SALES engineer with good appearance and qualifications is offered a permanent position with increasing scope, good salary, according to age and experience, and pension scheme. Help with housing. Sound knowledge required of transformers and regulators. Apply Sales Director, Brentford Transformers Ltd., Crawley, Sussex. 7153

SALES manager required. Must have knowledge of overhead transmission equipment and connection with the Area Boards. Good permanent and progressive opening for young man under 40. Write in first instance—Bowthorpe Electric Co. Ltd., Crawley, Sussex, addressed to Sales Director. 7165

STOREKEEPER required with a knowledge of electrical installation supplies by West End (London) wholesalers. Age about 25/30. Good opportunity for progress ; 5-day week. Write stating age and previous experience to—Box 7346.

SWITCHGEAR foreman is required by our associate company in Bombay, India, to initiate a switchgear assembly section. The position would suit a young man with preferably some supervisory experience on switchgear. Write to Ref. MD/P/SF, Crompton Parkinson Limited, Crompton House, Aldwych, London, W.C.2, stating age, experience and family. 7361

SWITCHGEAR sales engineer (inside) required to deal with enquiries and orders for a wide range of substation and power station switchgear. Applicants should have a fair knowledge of switchgear requirements and should state their technical qualifications and practical experience. Apply in first instance to the Personnel Officer, Ferguson Pailin Ltd., Higher Openshaw, Manchester, 11. 7249

SALES representative reqd. by manufacturers of electrical switches and accessories for London and Home Counties. Good salary and expenses. Own staff advised.—Box 7273.

TECHNICAL assistant for sales office engaged in tendering and executing contracts for transmission line insulation. Qualifications : Higher National Certificate preferable, and previous tendering experience and ability to handle correspondence would be considered an advantage. Replies stating age, qualifications and experience should be addressed to the Personnel Officer (Staff), Pilkington Brothers Limited, St. Helens, Lancashire. 7335

TECHNICAL assistant required for development work on automatic fuel controls. Good mechanical and electro-technical knowledge an advantage. Excellent opportunity to build career with progressive company. Apply in own handwriting, stating age, education, qualifications, training, experience and salary required. — Technical Manager, Perl Controls Ltd., 45, Gatwick Rd., Crawley, Sussex. 7363

TECHNICAL assistant required for the lighting department. Minimum qualifications O.N.C. electrical engineering. Apply giving details of qualifications, experience, etc., to—The Manager, Research and Development Department, Revo Electric Co. Ltd., Tipton, Staffs. 7336

TECHNICAL assistant required with H.N.C. or degree in physics or electrical engineering, to deal with various aspects of development of power capacitors and the use of a surge-generator of 1½ M. volts. The post also provides a good opportunity for experience in the high-voltage field in connection with the testing of power transformers up to 15,000 kVA. Apply in writing in the first place to—Chief Engineer, Bryce Electric Construction Co. Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. 7278

TECHNICAL assistants (one senior, one junior) for the preparation of lighting schemes, illuminating engineering dept., old-established mfrs. of lighting equipment. 5-day week. Pension fund. State age and experience. —Chief Engineer, Technical Service Dept., Holophane Ltd., Elverton St., Westminster, London, S.W.1. 7183

TECHNICAL journalist. Metropolitan-Vickers requires assistant with technical background and some journalistic experience for press liaison work in publicity department (at Trafford Park, Manchester). Principal duties would be to collect and/or edit information for issue to the technical press, but some semi-technical or popular writing may also be required. The company's activities cover a wide range of mechanical and electrical engineering. Write giving details of education, training, experience, age, present position and salary to the Manager, Publicity Department, Metropolitan-Vickers Electrical Co. Ltd., Mosley Road Works, Trafford Park, Manchester, 17. 7154

THE REVO ELECTRIC Company Limited require a sales engineer at their head office near Dudley for special work on the promotion of sales of lighting and industrial equipment. Applications are invited from men of good education, aged 30-35, with technical and commercial experience in the lighting industry and knowledge of lighting technology. The position is pensionable and offers good prospects. Apply in writing to the Sales Manager, Industrial Division, Revo Electric Co. Ltd., Tipton, Staffs, stating previous experience and salary required. 7279

TRANSFORMER designer for all types up to 750 kVA. Good commencing salary, and if required help with housing could be arranged. Growing company near London. Our Staff have been informed of this advert. —Box 7281.

TRANSFORMERS & RECTIFIERS Ltd., Millmead, Guildford, Surrey, require a designer for units up to 500 kVA. An excellent opportunity exists for a man who is looking for a situation with really good prospects in an expanding business. Applicant with a good general knowledge may eventually also undertake rectifier work. Housing assistance. Good salary. Reply in confidence. 7282

TRUST HOUSES Ltd. have a vacancy for a junior electrical engineer with previous experience or apprenticeship in contracting for lighting and heating, capable of preparing specifications under supervision. Willing to travel in England and Scotland. Pension scheme. Apply Deputy General Manager, Trust Houses Ltd., 53, Short's Gardens, London, W.C.2. 9102

APPOINTMENTS FILLED

Dissatisfaction having so often been expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

ASSISTANT sales manager, now with leading London wholesaler seeks new appointment. Wide experience, now responsible for entire internal administration, including buying and order departments. Possesses drive and imagination. Age 27. Free 1st October.—Box 9107.

EASTERN Counties. Young middle-aged experienced representative, good connections all aspects electrical trade, seeks position with firm of repute.—Box 9099.

ELECTRICAL engineer, B.Sc., A.M.I.E.E., holding senior project situation, London, seeks position N. Somerset/Bristol area. Experienced design, contract, installation, etc., large industrial distribution, power, light, heat, vent. schemes.—Box 9083.

ELECTRICAL engineer, fluent English, German, French, 2 years' sales engineering, 4 years' experience continental installation, power engineering, electrification schemes of public buildings and factories, seeks technical or administrative position with consulting, contracting engineering or export firm.—Box 9106.

FOREMAN/supervisor electrician (34) seeks employment September anywhere in U.K. 18 years' experience factory maintenance and installation, engineering and plastics industries. Capable preparing layouts, etc. Present location Midlands. Refs. available.—Box 9090.

KEEN representative, age 40, 11 years' trade experience, desires change, London/Eastern Counties, manufacturer or wholesaler.—Box 9085

QUALIFIED elect. engr., G.I.E.E., G.I. Mech.E., seeks responsible position as tech. engr. or tech. sales engineer. Experienced design, contract, installations, etc., large industrial distribution, power, lighting schemes. Exp. handling enquiries to final accounts.—Box 9101.

REPRESENTATIVE (45), wide experience electrical and non-ferrous precision eng. trades, seeks change. London based. Contacts with elec. wholesalers, contractors, elec. boards, gas boards, manufacturing engineers, etc.—Box 9103.

SALES representative. Advertiser, of smart appearance with own car, seeks position of trust and responsibility with a manufacturer requiring a keen go ahead representative in the Midlands. 30 years' outdoor sales experience in the electrical trade (the past 19 years with leading E.L.M.A. manufacturer in Birmingham), contacts with electrical wholesalers, large works users, borough engineers and M.E.B. offices; used to working on initiative at top levels. Owing to amalgamation now seeks position elsewhere, where connections and contacts would be of service.—Box 9100.

ARTICLES FOR SALE

COUNTY BOROUGH OF SWANSEA

Swansea Technical College

ELECTRICAL EQUIPMENT FOR DISPOSAL

TENDERS are invited for the above, which includes Rotary Converter, Motor Compounds, Motor Alternator Set, Shunt Motors, Induction Motors, etc., some of which are in running order. No guarantee is given on the operating efficiency of any of the equipment.

The machines can be inspected by arrangement at the Swansea Technical College, Mount Pleasant, Swansea.

Tenders to be submitted on the official form and specification obtainable from the Borough Architect, The Guildhall, Swansea, and shall be forwarded by registered post (or delivered in exchange for a receipt) in the envelope supplied, which shall bear no name or mark indicating the sender, so as to reach the Town Clerk, The Guildhall, Swansea, not later than Friday, the 20th September, 1957.

The Corporation does not bind itself to accept the highest or any tender.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
23rd August, 1957. 7286

B. C. S.

Available for Immediate Delivery

ONE 600-kW SULZER Diesel Generating Set, 220/440 volts D.C., complete with auxiliaries, spares, etc.

One 850-kW SULZER Diesel Alternator Set, 400/440 volts, 3-phase, 50 cycles, 428 r.p.m., complete with auxiliaries, etc.

One 55-kW McLAREN/BRUSH Diesel Alternator Set, 400/440 volts, 3-phase, 50 cycles, 1,000 r.p.m., complete with auxiliaries and switchboard.

Two 20-kW HILL & CO./DELCO Diesel Generating Sets, 120 volts D.C., 1,450 r.p.m., complete with auxiliaries.

Other sets in stock.

B.C.S. ENGINEERS & CONTRACTORS LTD.
3, Castle Street, Cardiff
(Tel.: Cardiff 29246) 231

B. C. S.

Available for Immediate Delivery

ONE 1,500-kW BRUSH Ljungstrom Turbo-Alternator Set, 6,600 volts, 3-phase, 50 cycles, 0.8 p.f., w.p. 200 lb. p.s.i., complete with auxiliaries.

One 3,000-kW BRUSH Ljungstrom Turbo-Alternator Set, 6,600 volts, 3-phase, 50 cycles, 0.8 p.f., w.p. 200/250 lb. p.s.i., complete with auxiliaries.

Other sets in stock.

B.C.S. ENGINEERS & CONTRACTORS LTD.
3, Castle Street, Cardiff
(Tel.: Cardiff 29246) 233

ELECTRIC HOUSE SERVICE METERS

PREPAYMENT and credit, 200/250 v. A.C., s/p., 50 c., 2½-100 A. Fixed or variable tariff. Reconditioned, fully tested and guaranteed 2 years. Prompt delivery, carriage paid.

ALBERICE METER COMPANY
Fairfax Works, Fairfax Rd., London, N.8
(Tel. MOUntview 7944, 6373) 191

B. C. S.

LARGE comprehensive stock of Brand New Spare Parts for GENERAL MOTORS Model 16-278A Diesel Engines available. Price list forwarded on request.

B.C.S. ENGINEERS & CONTRACTORS LTD.
3, Castle Street, Cardiff
(Tel.: Cardiff 29246) 232

A BABCOCK & Wilcox water tube boiler will cut down your fuel costs; we can supply from stock. Two 40,000 lb. evap., 220 lb. w.p.; one 25,000 lb. evap., 200 lb. w.p.; 3,000 lb. evap., 400 lb. w.p.; Spencer Bonecourt boiler; also Marine, Cornish vertical, etc.—Burford, Taylor & Co. Ltd., Boiler Specialists, Burtayco House, Church Street, Middlesbrough (Tel. Middlesbrough 2622). 122

A.C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. (Edgware 5566/9). 91

A.C. and D.C. 1/- Slotmeters. Guaranteed 2 years, 2½-50 amps. From 50/-. Repairs and recalibrations. See Billiard: Tradex Meter Co., Surbiton (Tel. Elmbridge 4487). 169

ALTERNATORS from ½ to 675kVA in stock, single and three-phase, all voltages and frequencies. Guaranteed. Many unused. Send your requirements.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 162

ALTERNATORS, generators, 1-100 kVA, all voltages. Specialists—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 147

ALTERNATORS, 3-phase, all sizes in stock from 7 kVA up to 330 kVA.—Britannia Manufacturing Co. Ltd., 20/26, Britannia Walk, London, N.1 (CLErkenwell 5512). 24

AUTO transformer starters, all 400-440/3/50, oil immersed; 150 h.p., Allen West; 4 off 95 h.p., Erskine Heap; 75 h.p., Allen West; 60 h.p., A. West; 50 h.p., Metro-Vick.; 65½ amp., Ellison; 50 h.p., Ellison; 45 h.p., A. West; 49½ amp., Ellison; 40 h.p., A. West; 3 off 44 amp., Ellison; 27 h.p., A. West; 3 off 15 h.p., Erskine Heap.—J. S. Ramsbottom & Co. Ltd., Elec. Engs., Keighley (3774/5/6). 68

BARGAINS in electric motors are always being obtained from A. Cooksley & Co. Ltd., 21/25, Tabernacle Street, London, E.C.2. Stocks include A.C. and D.C. motors, second-hand and new up to 30 h.p. Starters, slide rails and pulleys. Ring Mon. 3355 for your requirements. 50

BILLIARD Meters. 1/-, 6d. or 1d. slot. All time settings. From 140/-. See Quarterly.—Tradex, Surbiton. 170

BRAND new and unused Evershed & Vignoles series 1 bridge Megger testing set, Cat. No. 35059. Testing 1,000 volts, range 0/100 megohms, with 4-dial resistance box adjustable 1/9999 ohms. To-day's list price £189 10s. Offered with immediate delivery at the unrepeatable sum of £120 net.—J. H. Elsby, Market St. West, Birkenhead (Tel. 3192). 7178

BRUCE Peebles 150-kVA alternator, 600 r.p.m., 400 volts, 3-phase, 50 cycles, 4-wire, complete with control panel.—Whitefield Machinery & Plant Limited, Cobden Street, Salford, 6 (Tel. PEN. 4746). 304

CABLE, underground, all types ex stock.—E. M. Tatton Co. Ltd., Kew Bridge, Brentford (Ealing 3155/6). 117

CABLE, underground, PILC/VIR/LC, ex London stock. Cutting orders same day delivery London area. Send for priced stock lists.—Batt Electrical Co., 6, Dock Street, London, E.1 (Tel. ROYal 5905). 316

CIRCUIT breakers, various sizes in stock, A.C. and D.C., 200 amperes up to 2,000 amperes. Also dynamo and alternator switchboards.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 26

CONVERTERS, 110 and 220 v. D.C./230 v. A.C., .5 to 6 kVA; also A.C./D.C. Special voltages at short notice.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 150

CRANE motors. Direct current, series wound or compound wound, all voltages. We have large stocks.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 22

DIESEL engine-driven generating set, 50 kVA, 400/230 v., 3-phase, 4-wire, A.C., 50 cycles. Powered by Sentinel 4 S.R.H. diesel engine direct coupled to Mawdsley 50-kVA alternator, complete with switchboard, in one unit, as new. Stand-by use only.—Fieldway Dairies, 32, Columbia Rd., Bournemouth. 7366

DIESEL generating sets, all sizes to 500 kW. Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 16

DISPERSIVE reflectors, green enamel with white interior, 60, 100, 300 and 500-watt sizes available. Cheap, in lots of one dozen.—Leighton Warehouse Company, 6, Church Road, Linslade, Leighton Buzzard (Tel. L.B. 3400). 9092

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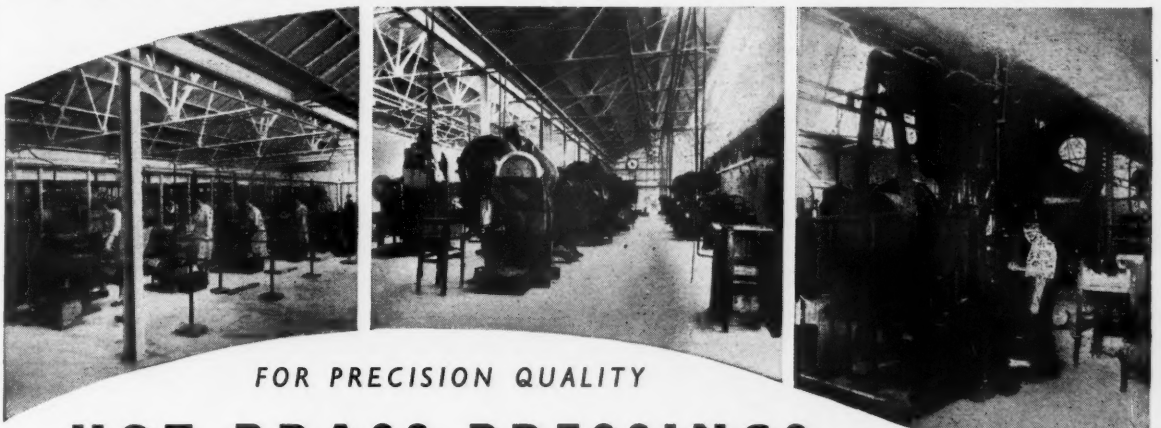

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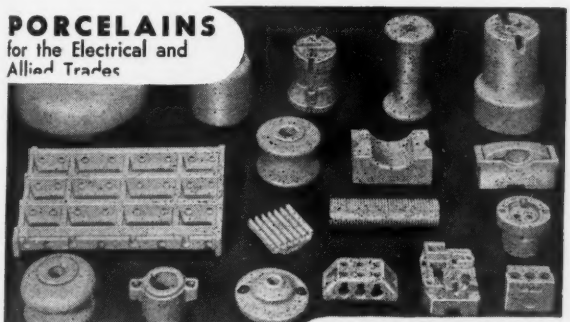

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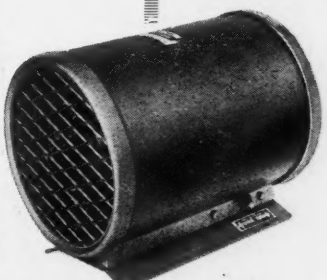

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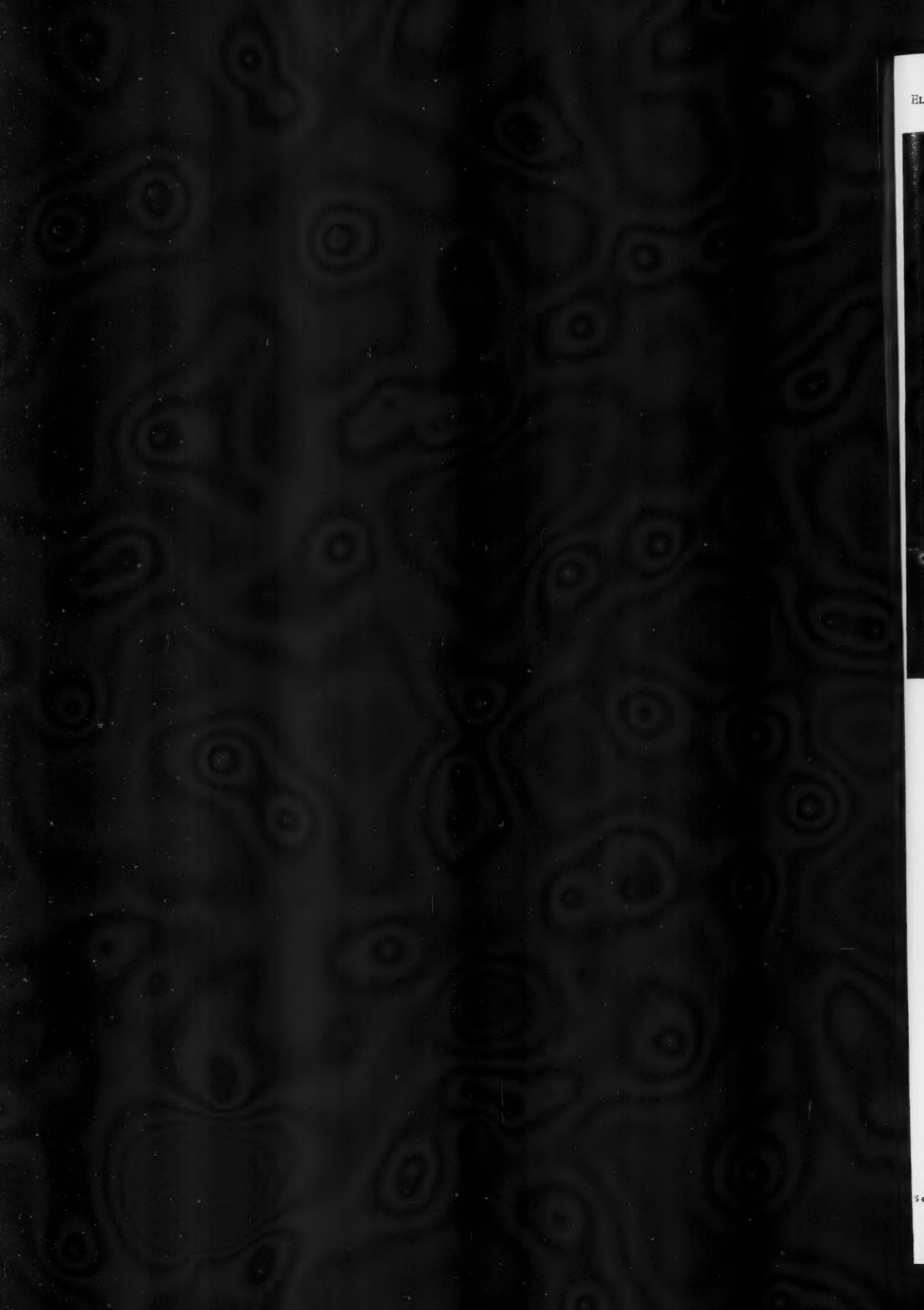

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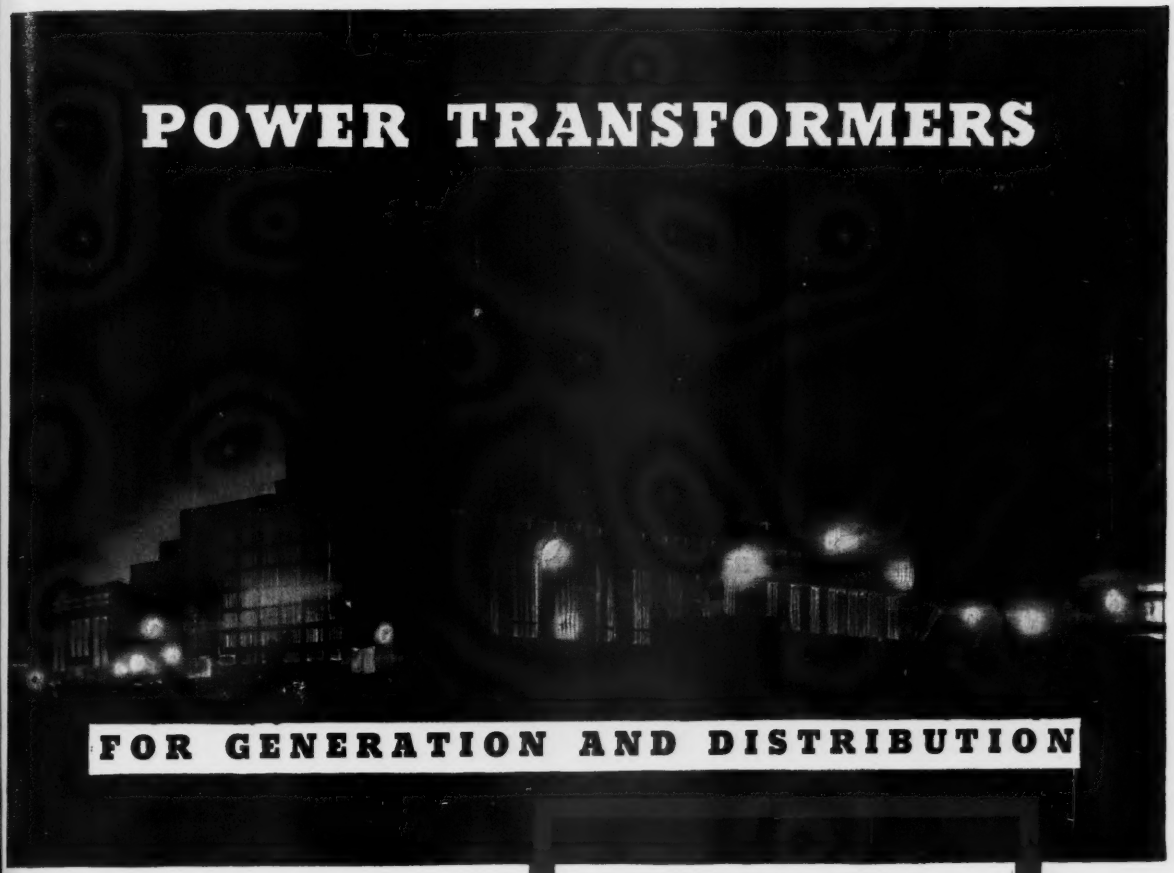

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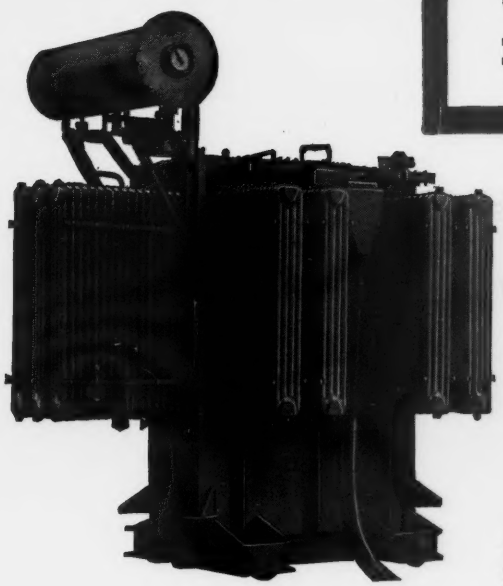

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